Just for your Tandy Color Computer 1, 2 and 3

June 1989

Canada $4.95 U.S. $3.95

The RAINBOW

THE COLOR COMPUTER MONTHLY MAGAZINE

Summer Fun

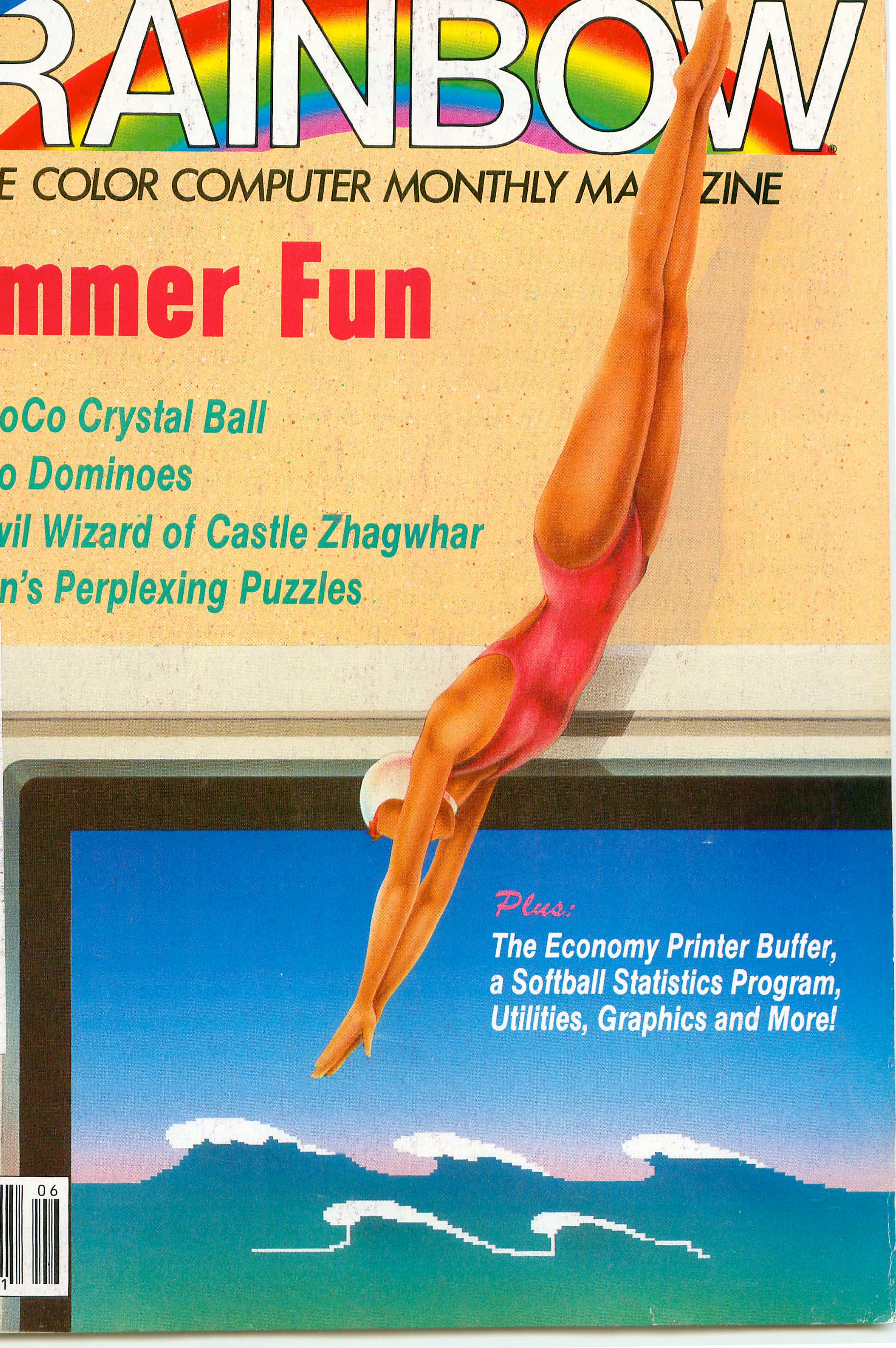
With:

The CoCo Crystal Ball

Electro Dominoes

The Evil Wizard of Castle Zhagwhar

Barden's Perplexing Puzzles



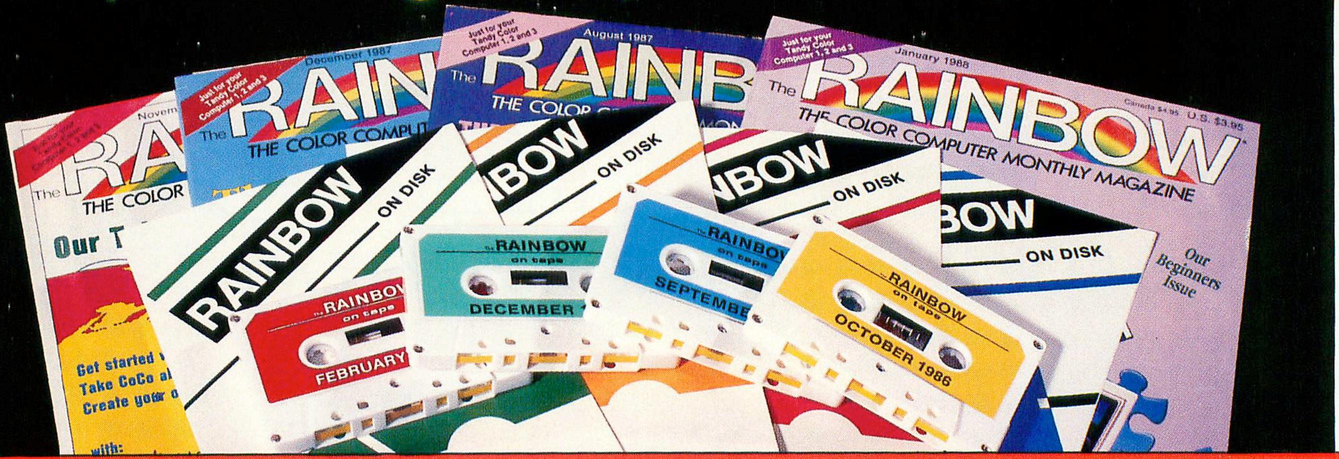
Plus:

The Economy Printer Buffer, a Softball Statistics Program, Utilities, Graphics and More!

[redacted]
SUB 38538 EXP 8909 RBOW06/89

0 44254 00001 06

Still pounding away at that keyboard?



Save Time and Money with a Combination Subscription!

SAVE up to 19%

when you buy a joint subscription to the magazine and either RAINBOW ON TAPE or RAINBOW ON DISK! A one-year subscription to THE RAINBOW and RAINBOW ON TAPE is only $91 in the U.S., $108 in Canada, $153 foreign surface rate and $188 foreign airmail. A one-year subscription to THE RAINBOW and RAINBOW ON DISK is only $115 in the U.S., $138 in Canada, $183 foreign surface rate and $218 foreign airmail.*

Every month, these convenient services bring you as many as 24 ready-to-run programs. Using the current issue of THE RAINBOW as documentation, all you have to do is load and run them. A one-year combination subscription to THE RAINBOW and RAINBOW ON TAPE or RAINBOW ON DISK give you more than 230 new programs! The typing time you save can be spent enjoying your CoCo!

RAINBOW ON TAPE
For No-Fuss Fun

Back issues of RAINBOW ON TAPE are available beginning with the April 1982 issue. A single copy of RAINBOW ON TAPE is $10 within the United States; U.S. $12 in all other countries. The annual subscription rate for RAINBOW ON TAPE is $80 within the U.S.; U.S. $90 in Canada; and U.S. $105 for all other countries.*

RAINBOW ON DISK
Offers OS-9 Programs

In addition to all the programs offered on tape, part of one side of RAINBOW ON DISK is formatted for the OS-9 operating system. That means you can now get all the OS-9 programs from the magazine — programs that cannot be put on tape. Back issues of RAINBOW ON DISK are available beginning with October 1986. Subscriptions to RAINBOW ON DISK are $99 a year in the U.S. Canadian rate is U.S. $115. All other countries, U.S. $130. Single copy rate is $12 in the U.S.; U.S. $14 in Canada; and U.S. $16 in all other countries.*

To order by phone (*credit card orders only*), call (800) 847-0309, 8 a.m. to 5 p.m. EST. All other inquiries call (502) 228-4492.

Look for our envelope located between pages 66 and 67 for ordering individual subscriptions to THE RAINBOW, RAINBOW ON TAPE and RAINBOW ON DISK.

YES! Sign me up for a joint 1-year subscription (12 issues) to:

☐ **THE RAINBOW and RAINBOW ON TAPE**
☐ **THE RAINBOW and RAINBOW ON DISK**
☐ **NEW** ☐ **RENEWAL** (attach labels)

Name ______________________
Address ______________________
City ____________ **State** ________ **ZIP** ________

Payment Enclosed ☐ **(*payment must accompany order)**
Charge: ☐ **VISA** ☐ **MasterCard** ☐ **Am. Express**
Account Number ______________________
Signature ______________________ **Exp.** ________

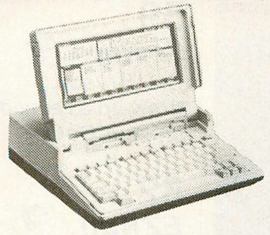
*U.S. currency only, please. In order to hold down costs, we do not bill. Kentucky residents add 5% sales tax. Please allow 6 to 8 weeks for delivery of first copies. Joint subscriptions to THE RAINBOW and RAINBOW ON TAPE or RAINBOW ON DISK begin with the current issue.

Please note: While group purchases of RAINBOW ON TAPE and RAINBOW ON DISK are permitted (and multiple subscriptions are even discounted, if purchased in one order from a club), no license to make copies is conveyed or implied. Yes, your group may even purchase a subscription to our disk/tape services, but such purchase in no way authorizes that *any* copies be made of that original disk/tape. Specifically, this means that the original disk/tape itself may indeed be kept in a club library for use by members. However, a group purchase *does not* entitle club members, individually or as a group, to copy that disk/tape.

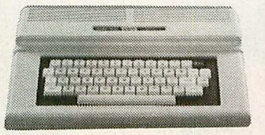
Unauthorized copying of any copyright product is strictly illegal. The copyright (right to make copies) is in no way conveyed in the purchase transaction.

From Computer Plus to YOU . . .

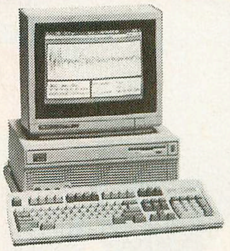
PLUS after PLUS after PLUS



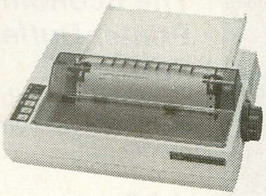
Tandy 1400 LT $1369
Tandy 102 32K $439
Tandy 200 24K $429*



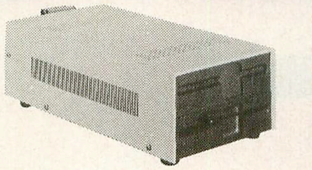
Color Computer 3
w/128K Ext. Basic $129*



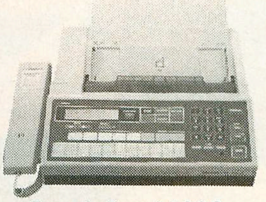
Tandy 1000 SL $599*
Tandy 1000 TL $969



DMP-132 $199*



Color Computer Disk Drive
Drive 0 $179* Drive 1 $149



TandyFax $1029

BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS

COMPUTERS	
Tandy 1000 HX 1 Drive 256K	539.00
Tandy 1000 TX 1 Drive 640K	799.00*
Tandy 3000 NL 1 Drive 512K	1279.00
Tandy 4000 1 Drive 1 Meg.Ram	1959.00
Tandy 5000 MC 2 Meg. Ram	3799.00
PRINTERS	
Radio Shack DMP-106 80 CPS	169.00
Radio Shack DMP-132 120 CPS	199.00*
Radio Shack DMP-440 300 CPS	549.00
Radio Shack DWP-230 Daisy Wheel	269.00*
Tandy LP-1000 Laser Printer	1899.00
Star Micronics NX-1000 144 CPS	199.00
Star Micronics NX-1000 Rainbow	269.00
Panasonic KXP 1180 192 CPS	249.00
Panasonic KXP 1191 240 CPS	299.00
Panasonic KXP 1124 192 CPS	399.00
Okidata 320 300 CPS	369.00
Okidata 390 270 CPS 24 Wire Hd	515.00
NEC Pinwriter P-2200 170 CPS	399.00
MODEMS	
Radio Shack DCM-6	52.00
Radio Shack DCM-7	85.00
Practical Peripheral 2400 Baud	229.00
Practical Peripheral 1200 Baud	149.00

COLOR COMPUTER MISC.	
Radio Shack Drive Controller	99.00
Extended Basic Rom Kit (28 pin)	14.95
64K Ram Upgrade Kit (2 or 8 chip)	39.00
Radio Shack Deluxe Keyboard Kit	24.95
HI-RES Joystick Interface	8.95
Color Computer Deluxe Mouse	44.00
Multi Pak Pal Chip for COCO 3	14.95
PBH Converter with 64K Buffer	119.00
Serial to Parallel Converter	59.95
Radio Shack Deluxe Joystick	26.95
Magnavox 8515 RGB Monitor	299.00
Magnavox Green or Amber Monitor	99.00
Radio Shack CM-8 RGB Monitor	210.00*
Radio Shack VM-4 Green Monitor	99.00
PBJ 0K COCO 3 Upgrade Board	19.95
PBJ 512K COCO 3 Upgrade	CALL
Tandy 0K COCO 3 Upgrade Board	24.95
Tandy 512K COCO 3 Upgrade	CALL

COLOR COMPUTER SOFTWARE	TAPE	DISK
The Wild West (CoCo3)		25.95
Worlds Of Flight	34.95	34.95
Mustang P-51 Flight Simul.	34.95	34.95
Flight 16 Flight Simul.	34.95	34.95
COCO Util II by Mark Data		39.95
COCO Max III by Colorware		79.95
Max 10 by Colorware		79.95
AutoTerm by PXE Computing	29.95	39.95
TW-80 by Spectrum (CoCo3)		39.95
TeleWriter 64	49.95	59.95
TeleWriter 128		79.95
Elite Word 80		79.95
Elite Calc 3.0		69.95
CoCo 3 512K Super Ram Disk		19.95
Home Publisher by Tandy (CoCo3)		35.95
Sub Battle Sim. by Epyx (CoCo3)		26.95
Thexder by Sierra (CoCo3)		22.45
Kings Quest III by Sierra (CoCo3)		31.45
Flight Sim.II by SubLogic (CoCo3)		31.45
OS-9 Level II by Tandy		71.95
OS-9 Development System		89.95
Multi-View by Tandy		44.95
VIP Writer (disk only)		69.95
VIP Integrated Library (disk)		149.95

Prices are subject to change without notice. Please call for shipping charges. Prices in our retail store may be higher. Send for complete catalog

*Sale prices through 5/31/89

CALL TOLL FREE
1-800-343-8124

- *LOWEST POSSIBLE PRICES*
- *BEST POSSIBLE WARRANTY*
- *KNOWLEDGEABLE SALES STAFF*
- *TIMELY DELIVERY*
- *SHOPPING CONVENIENCE*

VISA AMERICAN EXPRESS MasterCard

computer plus

P.O. Box 1094
480 King Street
Littleton, MA 01460

SINCE 1973

IN MASSACHUSETTS CALL (508) 486-3193

TRS-80 is a registered trademark of Tandy Corp.

RAINBOW

Table of Contents

June 1989
Vol. VIII No. 11

110

Features

18
Electro Dominoes
Jeff Steidl
A new domino theory — put it on a CoCo and it will be much faster, more fun and much more colorful

22
Self Portrait
James A. Tatarka
A tribute to the CoCo 2

28
Fortune Teller
Paul D. Burnham
Use the pyramid method to answer your questions

41
Castle Zhagwhar
Keith Schuler
An adventure in the kingdom of Lithana

48
Now You See It, Now You Don't!
Jean-Francois Morin
Five optical illusions to display on your CoCo 3 monitor

52
CoCo in 3-D!
Eugene Vasconi
Put a new twist in computer graphics

56
The CoCo Quiz Master
Bill Bernico
Astound your non-computing friends by making the CoCo a "know-it-all"

59
Storm
B.J. Bryson
Brew up a rainy day on your CoCo

62
EZRun
Fred Kolesar
Auto-run BASIC programs by typing just their filenames

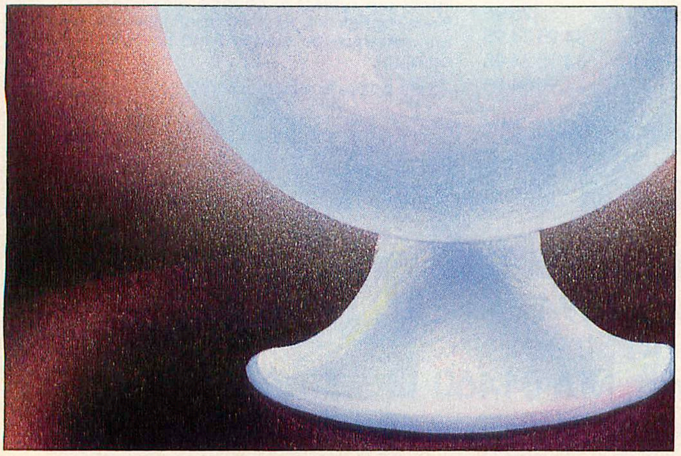
100
The Economy Printer Buffer, Part 1 of 2
Harleen Francisco
Increase your computing productivity

110
Fun Stats
Delbert Baker
Keep statistics for your softball team

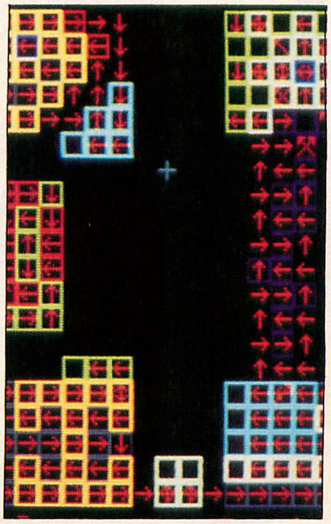
122
Selective Directory Listings
Richard Estrado
A wildcard utility for those hard-to-find disk files

136
PR. BO9
Richard Ries
An OS-9 printer utility

28



18



Novices Niche

89
Left Beats Right
Keiran Kenny

90
Asteroid Dodge
Clayton R. Moore

90
Elevators
Paul Nalos

91
Wordmake
Logan Bleckley, III

91
Diary
Bradley Hurt

92
Disks Named "Miscl"
Merle Miller

92
Sound Control
Joel Hegberg

93
Simple Draw
Darren Day

The cassette tape/disk symbols beside features and columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE and RAINBOW ON DISK. Those with only the disk symbol are not available on RAINBOW ON TAPE. For details, check the RAINBOW ON TAPE and RAINBOW ON DISK ad on the inside front cover.

Departments

Advertisers Index 160
Back Issue Info 147
CoCo Gallery 26
Corrections 66
Letters to Rainbow 6
Maxwell Mouse 58
One-Liner Info 156
One-Liners 85
Racksellers 158
Rainbow Info 16
Received & Certified 135
Scoreboard 94
Scoreboard Pointers 96
Submitting Material 152
Subscription Info 154

Columns

80
BASIC Training
Joseph Kolar
Boxcars, boxcars, boxcars

78
CoCo Consultations
Marty Goodman
Just what the doctor ordered

84
Doctor ASCII
Richard Esposito
The question fixer

76
Education Notes
Steve Blyn
Shooting math

12
Print #-2,
Lawrence C. Falk
Editor's notes

98
Turn of the Screw
Tony DiStefano
The DEFs of disk drives

87
Wishing Well
Fred Scerbo
The days of the week

"Basically Speaking" and "Delphi Bureau" will return next month.

Rainbowtech

140
Barden's Buffer
William Barden, Jr.
Perplexing puzzles to ponder

150
KISSable OS-9
Dale Puckett
Building two handy tools

"Accessible Applications" will return in August.

Product Reviews

The Black Grid/*SPORTSware* 130
Caladuril II — Weatherstone's End/*Oblique Triad* 126
Chess-Nuts/*Mousesoft Software* 132
Digitizer 3/*DSD Software* 134
Floppy Filer/*Gregory Software* 132
Hard Drive Utilities/*KB Enterprises* 129
Kcal/*King Cottage Industries* 128
Rustler/*King Cottage Industries* 131
Wargame Designer
Icon Disk #1/*SPORTSware* 133

THE RAINBOW is published every month of the year by FALSOFT, Inc., The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059, phone (502) 228-4492. **THE RAINBOW**, **RAINBOWfest** and **THE RAINBOW** and **RAINBOWfest** logotypes are registered ® trademarks of FALSOFT, Inc. • Second class postage paid Prospect, KY and additional offices. USPS N. 705-050 (ISSN No. 0746-4797). POSTMASTER: Send address changes to **THE RAINBOW**, P.O. Box 385, Prospect, KY 40059. Authorized as second class postage paid from Hamilton, Ontario by Canada Post, Ottawa, Ontario, Canada.

• Entire contents copyright © by FALSOFT, Inc., 1989. **THE RAINBOW** is intended for the private use and pleasure of its subscribers and purchasers and reproduction by any means is prohibited. Use of information herein is for the single end use of purchasers and any other use is expressly prohibited. All programs herein are distributed in an "as is" basis, without warranty of any kind whatsoever. • Tandy, Color BASIC, Extended Color BASIC and Program Pak are registered ® trademarks of the Tandy Corp.

• Subscriptions to **THE RAINBOW** are $31 per year in the United States. Canadian rates are U.S. $38. Surface mail to other countries is U.S. $68, air mail U.S. $103. All subscriptions begin with next available issue. • Limited back issues are available. Please see notice for issues that are in print and their costs. Payment accepted by VISA, MasterCard, American Express, cash, check or money order in U.S. currency only. Full refund after mailing of one issue. A refund of 10/12ths the subscription amount after two issues are mailed. No refund after mailing of three or more magazines.

The Rainbow

Editor and Publisher
Lawrence C. Falk

Managing Editor Jutta Kapfhammer
Associate Editor Sue Fomby
Reviews Editor Lauren Willoughby
Submissions Editor Tony Olive
Copy Editor Kelly Goff
Technical Editors Cray Augsburg, Ed Ellers
Technical Assistant David Horrar
Editorial Assistant Vivian Turbeville
Contributing Editors
William Barden, Jr., Steve Blyn, Tony DiStefano, Richard Esposito, Martin Goodman, M.D., Joseph Kolar, Dale Puckett, Fred Scerbo, Richard White
Art Director Heidi Maxedon
Designers Sharon Adams, Teri Kays, Denise Webb
Typesetter Renee Hutchins

Falsoft, Inc.

President Lawrence C. Falk
General Manager Bonnie Frowenfeld
Asst. General Mgr. for Finance Donna Shuck
Admin. Asst. to the Publisher Kim Thompson
Editorial Director John Crawley
Asst. Editorial Director Judi Hutchinson
Director of Production Jim Cleveland
Chief Bookkeeper Diane Moore
Dealer Accounts Judy Quashnock
Asst. General Manager For Administration Sandy Apple
Word Processor Manager Patricia Eaton
Customer Service Manager Beverly Bearden
Customer Service Representative Carolyn Fenwick
Chief of Printing Services Melba Smith
Dispatch Paul Bauscher
Business Assistants Laurie Falk, Janie Stainback
Chief of Building Security and Maintenance Jessie Brooks
Advertising and Development Coordinator Ira Barsky
Advertising Representatives Belinda Kirby, Kim Vincent
Advertising Assistant Debbie Baxter
(502) 228-4492

For RAINBOW Advertising and Marketing Office Information, see Page 160

Cover illustration by Fred Crawford

Letters to the RAINBOW

Foreign Characters

Editor:

I am a missionary in Quito, Ecuador. During 14 years of service here, the last seven have been enhanced through the use of Color Computers. I brought the first one here in 1982 and it continues to operate to this very day in our Bible Institute. I upgraded it from 16K to 64K myself. I learned BASIC, assembly language, OS-9 and much more with that old gray machine. It cost an arm and a leg at that time, but it has been worth it.

Since then, I have greatly computerized our work here, using only Color Computers. There is a CoCo system in every major ministry of our church — our boy's home, recording studio, book store and Christian Book distribution. Our maximum configuration is a CoCo 3 with 512K, a 15-Meg hard drive, OS-9 Level II and CM-8 monitor. It is used to maintain the entire operation and inventory of over 1500 different Christian titles.

Because of the isolation that we live in, even mail can be delayed many months. (I just received the November issue yesterday.) Sometimes mail doesn't even make it, which is very discouraging when one has paid more than double the subscription price just for postage. After living here so long, I consider the U.S. postal system to be one of the wonders of the world. People who complain about it should be sentenced to one year in a third-world country.

The days are gone that I can take the luxury of typing in long and powerful programs. Have all the talented programmers abandoned the CoCo world? Only programmers can make the Color Computer the machine it should be!

There is very little, if any, superior programming for the CoCo 3. There isn't even a really decent database. Simply porting programs over to the 80-column screen and speeding them up is an insult to the power built into the CoCo 3.

I used a modified version of *VIP Writer* (one that I modified myself) that produces Spanish letters on its graphics screen which correspond with my printer's Spanish characters (Okidata 192). I have not upgraded to the new version of the program because I don't want to take the time to repeat the work of modifying it.

IBM clones, and even the Tandy 600, provide the IBM G2 character set which works on most of our printers. It makes writing in Spanish so easy. Bill Barden's article on teaching the CoCo 3 the Tandy 1000 character set (which is essentially the same as the IBM G2), was very well done. Thus, a CoCo 3 could produce Spanish documents on a G2 printer and display them simultaneously on the screen. Doing so from BASIC doesn't interest me though, and what I gather from the new CoCo 3 word processors, there is no indication that any of them make the work of writing in a foreign language any easier. Only software that gives intelligent support for foreign language characters, such as IBM's G2 standard using 8-bit data, will ever become very popular outside the USA. Isn't there any demand for foreign language characters within the U.S. borders? I understand that foreign languages are still being taught in both high school and college. *Max-10* looks nice, but it doesn't support G2 characters. Even Tandy printers now support G2!

It is far less important to the majority of buyers in a foreign land, if the program speaks another language (prompts in Spanish) than it is if the program produces foreign language (the final product).

I like the CoCo! It is a cheap computer with great value. What I ask of it does not require any new hardware. I only ask that consideration be made [for foreign characters] while developing programs — especially word processors, databases and spreadsheet programs. It should be as much a part of OS-9, as it is a part of MS-DOS.

Reverend Kepler Nigh
Quito, Ecuador

The Best Kept Secret . . .

Editor:

Just a while ago, I was at a computer store talking to one of the salesmen who sells many different brand names — Atari to Samsung. I mentioned to him that I had a CoCo 3 and was learning OS-9. I asked him if he was familiar with OS-9, and he said, "No."

I told him that it was a UNIX-like operating system. He was stunned. The look on his face was worth many "bytes." He asked me, "Are you serious, UNIX has multitasking capability?"

I told him that OS-9 did, too. He couldn't believe the CoCo could do that. Five minutes later, he was still shaking his head. He just couldn't get over the fact that the CoCo could run an operating system similar to UNIX.

The CoCo 3, unfortunately, is the best kept secret.

Fred Lajoie
Kentville, Nova Scotia

BACK TALK

Editor:

With regard to the query by Al Bilinski (of Selkirk, Manitoba) who wanted to run *DynaCalc* on the CoCo 3: Australian Peripheral Developments can provide a working version of the RS-DOS *DynaCalc* which will run on the CoCo 3.

Simply forward your original master disk along with $30 to the address listed below. The master disk will be returned with a working *DynaCalc* disk for the CoCo 3, and instructions for making backups.

John Poxon
Australian Peripheral Developments
94 Chatswood Road
Slacks Creek. 4127
Australia

HINTS & TIPS

Editor:

I have been an avid RAINBOW reader and CoCo programmer for about six years now. I started out on a 16K ECB CoCo 2, quickly upgraded to 64K, two SSDD drives, CGP-115 and DMP-105 printers, Deluxe RS-232 Pak, Orchestra-90 synthesizer, etc.

My chief reason for selecting a CoCo, other than the price, was the outstanding graphics capabilities. So, naturally, when the CoCo 3 became available, I had to have one!

I have been especially delighted with several programs and articles in RAINBOW about replacing `HSCREEN` character sets with customized fonts, particularly Eric Wolf's *Font Master* (October '88, Page 41). After hand-entering four or five font sets, I discovered that I could load my old *McPaint* and *Graphicom* fonts into memory with an offset of `&H749D`, then resave them with start, end and exec addresses of `&HF09D`, `&HF49C`, `&HF09D`, respectively. Then they can be loaded directly into memory for `HSCREEN` use, or by *Font Master* to be edited.

Some of my old fonts were saved as binary data files, rather than machine language files, i.e., `1 B 1`, instead of `2 B 1`. With these, I cheated and used *GregEterm* to load them one by one, then resave them as machine language programs, which then

RSB V1.2

A revolutionary program that allows you to use Basic Programs from OS9! OS9 Level 2 is the future of the CoCo. Unfortunately, many Basic Programmers are afraid of using OS9 because it is difficult to use. RSB allows you to run Basic from OS9 & take advantage of the features such as multi-tasking, no-halt floppies and high speed operation. Req. OS9 Level II. Latest Version! Only **$39.95**

VIP DATABASE III

Best Database for CoCo 3. Features 40/64/80 columns, easy-to-understand menu system, size limited only by disk space, LIGHTNING FAST in-memory sort, multiple search, built-in MATH PACKAGE, spooler and report generator, unlimited print formats & more. **$69.95**

VIP CALC III

Best Spreadsheet for CoCo 3. Features 4 color menus, 32/40/64/80 column display, 2 Mhz speed, more. Allows up to 1024 rows x 512 columns. VIP CALC III also has up to 16 windows, trig, averaging, sorting, algebraic & sorting functions. Locate, block move/copy commands & limitless programmable functions. Works with any printer. Only **$69.95**

512K BACKUP LIGHTNING

The ultimate CoCo 3 disk copy utility! Reads the master disk & makes as many copies as you want. Even copies to unformatted disks! Supports 35/40/80 track drives & various step rates. From Colorventure. **$19.95**

PRINTER LIGHTNING

The Ultimate print spooler. Allows you to use your printer & simultaneously continue with your programming. From Colorventure. CoCo 3 Disk only **$19.95**

FKEYS III

A user friendly, user programmable function key utility that creates up to 20 function keys. Includes EDITOR, DOS mods, DISABLE and its EPROMable! CoCo 3 Disk Only **$19.95**!

SIXDRIVE

Allows the use of 3 double-sided drives from RSDOS or ADOS. Only **$16.95**

CEBBS

by Kevin Berner

Best BBS for the CoCo 3. XModem Up/Downloading, unlimited menus, login, message base, built-in clock/calendar, execution of external programs. Sysop has full control of user's acess to menus, time on system and remote system access. Full Error Trapping. HyperIO Compatible. Introductory Special **$49.95**. Req. CoCo 3, 1 Drive & RS232 Pack.

XENOCOPY-PC

An amazingly versatile program that allows you to Format/ Duplicate/ Read/ Write/ Transfer Disks from 300 different computers (for ex. CoCo, IBM, PC-DOS, TRS-80 Model 3/ 4/ 100, Zenith, etc). Requires an IBM Compatible with 2 drives. Disk **$79.95** (Note: You cannot run ML programs of one machine on the other)

MAX10

Best Desktop Publishing / Document Creator for CoCo 3. Pull Down Menus, What You See is What You Get, UNDO, integrated text & graphics capability, multiple fonts & more. Graphics can be imported from CoCo Max I,II,III, MGE, MGF, 5 Level DS-69, PMODE 4, HSCREEN 2/3. Supports DMP 105/ 130, EPSON MX/ FX/ RX/ LX/ Gemini 10 series, CGP-220 and OKI-92. Only **$79.95**

ADOS 3

Advanced Disk Operating System for CoCo 3. Comes on disk and is EPROMable!! Disk **$34.95** ADOS (for CoCo 1,2): **$27.95**

BASIC FREEDOM

A Full Screen Editor for Basic Programs. Only **$24.95**

VOCAL FREEDOM

Turn your computer into a digital voice / sound recorder. Produces natural voice/sound effects. Req. inexpensive RS Amplifier (#277-1008) & any microphone. Only **$34.95**

HACKER's PAC

Allows you to incorporate voices created by Vocal Freedom into your own Basic & ML Programs. Only **$14.95**

RGB Patch

Displays most games in color on RGB Monitors. Only **$24.95**

Color Schematic Designer

by Prakash Mishra

An excellent Circuit Schematic Design Software Package. Features HSCREEN display, Pull Down Menus, RGB/ Composite/ Monochrome support, 72 modifiable symbols, hi-res fonts, UNDO command, Symbol Rotate/Line/ Box Draw, 3 layers of circuits & Screen Print Command for DMP/ EPSON/ GEMINI compatible printers. CoCo 3 Disk Only **$39.95**

CoCo Util II

COCO-DOS MS-DOS

Transfers ASCII files/Basic Programs to IBM compatible computers & vica-versa. Requires 2-drive IBM Compatible. Disk **$39.95** (Note: ML programs of one machine cannot be run on the other). Req MSDOS 3.2 or lower.

HYPERIO Utilities

by Kevin Berner

Hard Drive Utilities: MSA Backup, Copy/ Kill/ Rename, Hard Disk Backup to Floppies (& vica-versa), wild card & more. Only **$21.95**

Disk Doctor: Checks/locks out bad sectors. Only **$17.95**

Hard Drive Zap: View tracks, sectors, modify data on your hard disk. Only **$21.95**

Window Master

Windows for your CoCo 3! Imagine using Pull Down Menus, Buttons, Icons, Edit Fields in your Basic Programs. Has 5 fonts in 54 sizes, superb Basic Editor & more. Requires CoCo 3, 1 Drive, RS Hi-Res Interface & Joystick or Mouse. Only **$69.95**. Window Master & Hi-Res Interface. Only **$79.95**

Programming Tools

EDT/ASM 64D: Editor-assembler (Specify CoCo 1,2,3): **$59.95**

SOURCE: CoCo Disassembler. **$34.95**

SOURCE 3: $49.95

CBASIC: Best Basic Compiler. **$149.95**.

CBASIC III: $149.95

COCO MAX III (with interface): $79.95

COCO MAX II: Disk $77.95 Tape $67.95

MAXFONTS #1,#2,#3,#4: **Disk $19.95ea**

NX1000 Rainbow Driver: $19.95

MAXPATCH: Run CoCo Max 2 on CoCo 3. **$24.95**

Telewriter 64 : Best Word Processor for CoCo 1 & 2. **Disk $57.95. Tape $47.95**

Autoterm: Modem Software. Disk **$39.95** Cas **$29.95**

Pro Color File Enhanced 2.0: $59.95

MICROCOM SOFTWARE, 2900 Monroe Ave, Rochester, NY 14618
For Detailed Order Information, refer to Page 17 of our 6-page Ad series(Pgs 7-17).

VISA MasterCard AMERICAN EXPRESS DISCOVER

To Place Credit Card Orders Call Toll Free 1-800-654-5244 (9am-8pm 7 days/week)
Technical Support (4-8pm), Order Status, Info, Technical Info; 716-383-8830

UPS 2ND DAY AIR

allowed me to offset, load and resave them in a useful format.

I hope this information can be of some use and save others the wear and tear on keyboard and fingertips I was experiencing.

Keep up this outstanding publication.

Mike Hungerford
Escondido, California

INFO PLEASE

Editor:

I usually know a good deal when I see one, but . . . six months ago I logged on to the CoCo Master's BBS (whose number was published in RAINBOW) and made a deal to purchase two double-sided drives (which were advertised on the board) from the SysOp, George Proulx. At my request, I asked him to add a case, power supply and cable, and told him I would pay for the extra parts and labor involved. He agreed. The total cost of this equipment was $215. The drives were paid off in November. Now for the problem.

I contacted Mr. Proulx over the BBS, constantly asking him when he would be finished with my drives. He kept telling me they were just about done. Toward the middle of January, I contacted him again. This time he said they would be shipped to me within the next week. However, that was the last I've heard of him.

Since then he has taken his board down, changed his phone number, and I found out today that he has moved. What am I to do? I worked hard flipping burgers to pay for those drives! Any information on the whereabouts of this bum will be quite helpful and appreciated.

Peter Bott
1103 School Street
Jim Thorpe, PA 18229

Diet Management

Editor:

I own a 64K CoCo 2 with one disk drive and would like to correspond with other CoCo owners who are diabetic. Anyone who is into programming who would like to assist me in writing a computer program to help manage a diabetic diet can write or call me.

Donald J. Floodeen
611-1/2 2nd Ave. SE, #1
Aberdeen, SD 57401
605-225-9707

BUYER BEWARE

Editor:

I am writing to let you and your readers know of the gross lack of responsibility of one of your advertisers — Diecom Products, Inc. of Milton, Ontario. I am not the only one who has experienced major problems with this company which are as follows:

First of all, in the past, Diecom has advertised software before it was *actually* available. I called to order *Mission Rush'n Assault* and was told the game would not be available for two weeks, however, it had been advertised in THE RAINBOW two months prior to my call. *Medieval Madness* was not available until three months *after* it was advertised in your magazine.

Secondly, Diecom has been running its business from an answering machine, although the ad states "Personal Service 9-5 E.S.T." On January 10th I called and left a message regarding software availability, but no one returned my call. I called again on the 21st and on the second of February, still no returned calls. I decided to order *The RAT* package, especially after reading your reviewer's comments, and this is where my major problem began.

The RAT, designed for 128K and 512K machines did not work with my Tandy 512K upgrade. So what did I do? I called . . . silly me. Of course, they still haven't returned any of my calls. I had to go out and buy a new 128K CoCo 3 just to use the program. However, I still cannot use it to its full potential. A friend of mine experienced the same problem. He called Diecom several times also. We've both given up.

This brings me to my final complaint: I am writing a CoCo 3 adventure using *The RAT* to create the graphics screens, but I ran into a bug in my program where the saving/loading routine was causing conflicts. This time I wrote to Dave Dies, asking whether a new save/load routine is available for *The RAT*. (These are available for *Color Max 3* and *CoCo Max III*.) To this date (March 17), I still have not heard from Diecom.

I own my own business and I *know* you *must* return calls and *must* support what you sell. Otherwise, you won't last. For this reason, I'm surprised Diecom has lasted as long as it has!

J.T. Rawlinson
Toronto, Canada

Diecom Products, Inc. has ceased advertising its products in THE RAINBOW, *effective with the November '88 issue. We suspect that it is no longer in business.*

More Suds?

Editor:

I am in charge of maintenance for a commercial laundry, and I was wondering if you or any of your readers know of any software designed for maintenance reporting and scheduling. I have a CoCo 3, 128K, one disk drive, and printer.

Tom Boysen
1456 Elsie Court
Santa Rosa, CA 95401

REQUEST HOTLINE

Editor:

A while ago I wrote about hooking up the CoCo to a device on an overhead projector, showing a computer display to an entire class. The HJL monitor adapter has proved to work like a charm. Other adapters work under OS-9 programs in the graphics modes, but HJL does it all. Unfortunately, one solution led to another problem.

The Goldstar monitor sent with the adapter did not function. After plugging and trying all kinds of equipment, the long and short of it was that the CoCo and the Goldstar monitor did not work together. HJL has been very cooperative throughout and is sending another monitor. The HJL monitor adapter is a tight fit on my CoCo but is working well. The problem seems to be a slight incompatibility between the signal from the computer and the monitor. One or the other is a bit fussy about the signal. The reason the equipment works in some configurations was explained to me this way: Some equipment is more "forgiving" and can handle slight differences in signals.

When I was content with my b/w television, monitors were not in the picture. Buying an $88 monochrome monitor from Howard Medical changed all that. Would you and your technical staff consider doing some informational work on monitors in the future? I would like to have a more technical base to work from besides plugging and switching equipment.

The main reason for switching is to avoid interference. The clarity of the color display is nice, but the majority of what I do is word processing or programming, for which a monochrome display is fine. My activities in the classroom include Logo, beginning programming and keyboarding. The CoCo, via the PC Viewer is making its way more into math classes. Teachers are missing out on a low-cost alternative if they don't give the CoCo a chance. One improvement I am waiting for is a way to attach the disk drive cable permanently to the computer. Most of my trouble-shooting involves unplugging/plugging in the disk drive controller. The disk drive connection

Word Power 3.2

"... Just think of any word processing feature---chances are very likely that *Word Power* has it ... packs a lot of features ... excellent word processor..." - -- **Rainbow's Word Processor Comparison Article** *"Deciding What's Right For You"* April 1989 Rainbow: Page 26.

"... friendly...amazing execution speed...much easier to use than VIP software & 2 other word processing systems I've tried...very user-friendly...massive text storage capacity ...highest among word processors..." - **Rainbow Oct. 88 Review for Word Power**

More Versatile • More Powerful With Spooler • Calculator • Split-Screen • 2-Column Printing

Unparalleled Power packed in this 100% ML Word Processor written from scratch for the CoCo 3! **No other word processor offers such a wide array of features that are easy to learn & use.**

DISPLAY & SPEED

Word Power 3.2 runs at double-clock speed and uses the **true 80-column display** with lowercase instead of the graphics screen. The result is lightning fast screen reformatting and added speed! **All prompts are displayed in plain English in neat colored windows.** The current column number, line number, page number, percentage of free memory is displayed at all times. Even the **page break** is displayed so you know where one page ends and the other begins. The Setup program allows you to change fore/background colors as well as (in)visible carriage returns. Word Power 3.2 can be used with RGB/Composite/Monochrome monitors as well as TV.

MAXIMUM MEMORY

Word Power 3.2 gives you **over 72K** on 128K and **over 450K** on 512K CoCo 3 for Text Storage - more memory than any other CoCo word-processor. Period.

EFFORTLESS EDITING

Word Power 3.2 has one of the **most powerful and user-friendly full-screen editor with word-wrap.** All you do is type. Word Power takes care of the text arrangement. The unique **Auto-Save** feature saves text to disk at regular intervals for peace of mind.

Insert/Overstrike Mode (Cursor Style Changes to indicate mode); OOPS Recall during delete; Type-ahead Buffer for fast typers; Key-Repeat (adjustable); Key-Click; 4-way cursor and scrolling; Cursor to beginning/end of text, beginning/end of line, top/bottom of screen, next/previous word; Page up/down; Delete character, previous/next word, to beginning/end of line, complete line, text before/after cursor; Locate/Replace with Wild-Card Search with auto/manual replace; Block Mark, Unmark, Copy, Move & Delete; Line Positioning (Center/Right Justified); Set/Reset 120 programmable tab stops; Word-Count; Define Top/Bottom/Left/Right margins & page length. You can also highlight text (underline-with on-screen underlining, bold, italics, superscripts, etc.). Word Power even has a **HELP** screen which an be accessed any time during edit.

SPLIT-SCREEN EDITING

Splits the screen in half so you can view one portion of your text while you edit another. You'll love it!

MAIL-MERGE

Ever try mailing out the same letter to 50 different people? Could be quite a chore. Not with Word Power 3.2! Using this feature, you can type a letter, follow it with a list of addresses and have Word Power print out personalized letters. It's that easy!

CALCULATOR

Pop-up a 4-function calculator while you edit! Great for tables!

SAVING/LOADING TEXT

Word Power 3.2 creates ASCII format files which are compatible with almost all terminal/spell-checking & other word-processing programs. Allows you to Display Free Space, Load, Save, Append & Kill files. The ARE YOU SURE? prompt prevents accidental overwriting & deletion. You can select files by simply cursoring through the disk directory. Supports double-sided drives & step-rates.

PRINTING

Word Power 3.2 drives almost any printer (DMP, EPSON, GEMINI, OKIDATA, etc). Allows options such as baud rates, line spacing, page/print pause, partial print, page numbering/placement, linefeeds, multi-line headers/footers, right justification & number of copies. The values of these parameters & margins can be changed anytime in the text by embedding Printer Option Codes. The **WHAT YOU SEE IS WHAT YOU GET** feature allows you to preview the text on the screen as it will appear in print. You can view margins, page breaks, justification & more.

PRINT SPOOLER

Why buy a hardware Print Spooler? Word Power 3.2 has a **built-in Spooler** which allows you to simultaneously edit one document & print another.

TWO-COLUMN PRINTING

This unique feature allows you to print all or portion of your text in **two columns!** Create professional documents without hours of aligning text.

SPELLING CHECKER

Word Power 3.2 comes with spelling checker/dictionary which finds & corrects mistakes in your text. You can add words to /delete words from dictionary.

PUNCTUATION CHECKER

This checker will proofread your text for punctuation errors such as capitalization, double-words, spaces after periods/commas, and more. Its the perfect addition to any word processor.

DOCUMENTATION

Word Power 3.2 comes with a well-written instruction manual & reference card which makes writing with Word Power a **piece of cake!** Word Power 3.2 comes on an UNPROTECTED disk and is compatible with RSDOS. Only **$79.95**

MICROCOM SOFTWARE, 2900 Monroe Ave, Rochester, NY 14618

All Word Power 3.2 orders shipped by UPS 2nd Day Air at No Extra Charge in Continental US.

For Detailed Order Information, refer to Page 17 of our 6-page Ad series(Pgs 7-17).

To Place Credit Card Orders Call Toll Free 1-800-654-5244 (9am-8pm 7 days/week)

Technical Support (4-8pm), Order Status, Info, Technical Info; 716-383-8830

UPS 2ND DAY AIR

is a definite weak link in a classroom with a lot of users.

I'd also like to know the best way to get a better electronics background in order to eventually use the CoCo with robotics in the classroom.

Michael Franich
Lakeridge Jr. High School
5909 Myers Road
Sumner, WA 98390

Thanks for the suggestion! Some hackers have made a short (1 to 2 inch) ribbon cable to go between the cartridge port and disk controller. Once installed, they can put the controller right in the CoCo's case to keep it safe and out of the way.

Mistaken Identity

Editor:

We'd like to ask your help in straightening out a potentially damaging case of mistaken identity.

On March 27, the *Wall Street Journal* carried a story about abuses of 900-number information services by unscrupulous information services operators. One such operator was identified, in bold type, as Delphi Corporation.

The company, of course, has nothing to do with us [DELPHI — General Videotex Corporation]. However, we have been getting telephone calls, mail messages and other feedback that indicates that there is considerable confusion in the minds of the public about the issue.

We have been in contact with *The Journal*. We suspect, however, that the confusion is spreading rapidly beyond readers of the *Wall Street Journal* to computer users in general.

If you have the editorial space available, where you could mention the fact that our DELPHI has nothing to do with this Delphi Corporation of New York, it would be greatly appreciated.

Thank you for your help.

Wes Kussmaul
DELPHI Chairman
Cambridge, Massachusetts

OS-9bow?

Editor:

I have been a subscriber to the RAINBOW, off and on, since I bought my first CoCo in 1984. In the beginning I was thrilled with each issue. I spent hours typing programs into my computer, saving them to disk, running and debugging them, etc. Once in a while, I'd find a game that I liked, wear it out, learn how to win it every time, and then move on to my next favorite.

When I finally got fed up with typing BASIC programs, I started typing in the ML listings with the little BASIC ML loader from your pages, then with an assembler. I got frustrated soon because somehow I couldn't get the ML programs to run. I decided that ML wasn't my cup of tea and moved on to the greener grass of OS-9.

When I got OS-9 (Level II) I was continually told to refer to such-and-such a page in the red manual (Level I type), because everyone assumed that I had Level I first. Well, I didn't, and I still don't. Dale Puckett's column seems, at first glance, to be informative, but there are many times when I find references to Level I processes that aren't included in Level II, which makes much of the information contained therein to be of no real value to me.

My point is that I'd like to have the kind of excitement under OS-9 that I found with BASIC programs in the beginning. What I find in the RAINBOW, though, is 90 percent BASIC, 9 percent other and 1 percent OS-9. While my figures are, admittedly, bogus and exaggerated, you get the drift. How about an annual OS-9 issue to augment the annual Beginner's/Communication, etc., issues? If that's not possible, how about a subsidiary publication for OS-9 addicts? Call it OS-9bow or something, but cram it full of beginning, intermediate and advanced OS-9 projects. Teach us how to write processes, use the system, modify it for our own needs, grow into it, and even generate other programs for the OS-9 community.

William A. Smith
Charleston, South Carolina

See Lonnie Falk's "PRINT#-2," column on Page 10 of the May '89 issue for an explanation on why it would not be feasible to print a strictly OS-9 magazine.

As more OS-9 users become comfortable with using the operating system, we will receive more submissions on OS-9, and therefore, will have more information available to share with the CoCo community.

Attention OS-9 users and programmers: If you have experience using the OS-9 operating system, we desparately want your submissions!

KUDOS

Editor:

I have been an avid reader of RAINBOW since December 1985. It was your magazine that convinced me to purchase a Color Computer. Thanks for making a kids' toy into a computer that is more than just kid's stuff. I am writing because of the bold new direction your magazine is taking. In both your March and April issues, you have taken an area of interest to the CoCo community and done an in-depth comparative article on it: It was hard drives in March and word processors in April. This is the kind of information available in the MS-DOS community but has been scarce in the realm of the Color Computer.

Most readers do not have the resources to compare products themselves. Some are lucky enough to have access to the RAINBOWfests or to computer clubs where they can see the equipment or software run, but most of us are not that fortunate. I applaud your fine efforts in this area.

Keep up the good work. I can't wait to see an article on spreadsheets.

Jim & Lin Schulze
Tell City, Indiana

The Write Stuff

Editor:

Kudos to Dale Rickert and Simply Better Software's word processor, *Simply Better*. Kudos also to Cray Augsburg for his fine review, which led me to purchase the program.

Not only did I get immediate service from SBS, I got a long, informative conversation with Mr. Rickert, a personal touch that gave me confidence to buy from a new company!

I have tried close to a dozen CoCo word processors, and this one beats them all. It has features (like sorting and index and table of contents production) that I had only thought possible on programs costing 10 to 20 times more! Mr. Rickert has come down firmly on the side of reasonably priced, yet powerful software. At $29.95 there should be no reason at all for this product to ever show up on the "pirating networks."

Let's see more software of this kind and more of those comparative and highly informative articles, such as THE RAINBOW has run on hard drives and word processors.

Alan A. Klein
(subscriber since 1981)
Highland, West Virginia

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through *our Delphi* CoCo SIG. From the CoCo SIG> prompt, type `RAI` to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type `LET` to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

RSDOS Utilities

COCO 3 SCREEN DUMP

32/40/80 col. text, PMODE 4 Graphics Dump. Single Key Operation allows snapshots of screens even when programs are running! For DMP, Epson, Gemini & Compatibles. CoCo 1,2,3. Disk **$24.95**

SUPER TAPE DISK TRANSFER

Disk-to-Disk, Tape-to-Disk, Disk-to-Tape, Tape-to-Tape Copy. Copies Basic/ML/Data Files. CoCo 1,2 or 3. Min 64K Disk System. Disk **$24.95**

MAILLIST PRO

The ultimate mailing list program. Allows you to add, edit, view, delete, change, sort (by zipcode or name) & print labels. Its indispensible!! Disk **$19.95** (CoCo 1,2,3)

COMPUTERIZED CHECKBOOK

Let the CoCo balance your checkbook. Allows you to add, view, search, edit, delete & print. Updates balance after each entry. For checking, savings & other accounts. Disk **$19.95** (CoCo 1,2,3)

DISK LABEL MAKER

Allows elongated, normal & condensed format, Double Strike, Border Creation & multiple label printing. Supports DMP, Gemini, Epson, Star & Compatibles. CoCo 1,2,3. Disk **$19.95**

HOME BILL MANAGER

Allows you to enter bills under various categories and reminds you when they are due. CoCo 1,2,3. Disk **$19.95**

BOWLING SCORE KEEPER

Allows you to save scores under individual/teams, edit, delete & compare scores. A must for anyone who wants to keep track of bowling performance. Dsk **$19.95** (CoCo 1,2,3)

VCR TAPE ORGANIZER

Allows you to index tapes by title, rating, type, play time & comments; sort titles alphabetically & view/print selected tapes. If you own a VCR, this program is a MUST! Disk **$19.95** (CoCo 1,2,3)

DISK UTILITY 2.1A

Utilize a directory window to selectively sort, move, rename & kill files. Lightning fast Disk i/o for format, copy, backup & much more. This will become your MOST USED program. CoCo 1,2,3. New Low Price! ~~$24.95~~ **$16.95**

CALENDAR MAKER

Generate Monthly calendars on your printer for any year in the 20th century. Disk Only **$19.95**. CoCo 1,2,3.

BASIC Windows

(by Kevin Berner)

Allows you to run 6 Basic Program simultaneously. Great for many applications. 512K CoCo 3. Disk Only $34.95

ULTRAPATCH SYSTEM

by Randall Reid

Patches the Superpatch EDTASM+ for 80 columns, 47K Buffer & more. CoCo 3. $19.95

SMALL BUSINESS ACCOUNTING

A sales-based accounting package with sales entry, accounts receivable/payable, Payroll, Income Statement, Journal, Sales, Balance sheets & much more! **$79.95**

Inventory Control/sales Analysis

Disk Only $59.95

Payroll

Disk Only $59.95

Accounts Recievable

Disk only $59.95

Accounts Payable

Disk only $59.95

Personal Bookkeeping 2000

Disk only $39.95

OS9

Start OS9

An enjoyable Hands-on Guide to OS9 LII. Includes step-by-step tutorials, articles. Free disk includes examples & utilities. Req. 512K, OS9 Level II, 2 drives & monitor. Book + Disk **$32.99**

The Goldberg Utilities

Turbocharge your OS9 system. Allows you to find lost files, copy multiple files, sort lists, base conversion & much more. Disk only **$24.95**

The Zapper

Patch Disk Errors. Disk **$19.95**

Disk Manager Tree

Change/ create /delete directories fast. Rq 512K LII **$29.95**

Level II Tools

Wildcards, tree & windowing commands & 22 more utilities. Disk Only **$24.95**

Warp One

Complete LII Windowing, Terminal, Auto Dial, macros, file transfer, capture, timer, chat, etc. Req. 512K OS9 Level II & RS232 Pack. **$34.95**

Multi-Menu

Create your own pull-down menus. Rq 512K, OS9 Level 2 & Multi-Vue **$19.95**

OS9 Level 2 BBS v2.0

Supports Multiple users, Tsmon, login, chat, Message/ Mail Retrieval, Uloads, Dloads & much more. Req. 512K, Level 2 & RS232 Pack. **$29.95**

Presto Partner

RAM resident software which provides note-pad with calculator, calendar / alarm, phone book with auto-dial. Req 512K & OS9 Level II. Only **$29.95**

GSC File Transfer Utilities

Transfer files to & from MSDOS/ OS9/ RSDOS / Flex. Req OS9 (LII for Multivue version), 2 drives, SDISK/ SDISK3. Standard Version: **$44.95**. Multivue Version: **$54.95**

Xword

Best OS9 Word Processor with true character oriented editing & more. **$69.95**

XMerge

Mail Merge for Xword. **$24.95**

XSpell

Spelling checker with 40000 words. **$39.95**

XEd

OS9 Full Screen Editor. **$39.95**

XDis

OS9 Disassembler. **$34.95**

XTerm

Communications pro w/ Up/ Download, xmodem, serial/ RS232 Pack Support. **$49.95**

Xdir & XCal

Hierachial Dir & Cald. **$24.95**

OS9 Level II Ramdisk

Disk only **$29.95**

Wild & MV Version 2.1

Use wildcards with OS9 & re-arrange directory tree. **$19.95**

EZGen Version 1.04

Powerful OS9 bootfile editor. Change names, add/ delete modules, patch bytes, etc. **$19.95**

PC-Xfer Utilities

Format/Transfer files to/from MSDOS & CoCo. Level 1 or 2. Requires SDISK(3). **$44.95**

SDISK3

Standard drive replacement module allows full use of 40/80 track double-sided drives. Req Level II. **$29.95 SDISK: $29.95**

WIZ

Terminal Package with 300-19200 baud rates/windowing. Req. 512K/RS232 Pack. **$49.95**

DYNASTAR

Word Processor with Macros, terminals/windows, mail-merge & more. Only **$99.95**

DYNASPELL

Disk Only **$79.95**

Both Dynastar & DynaSpell: $124.95

MICROCOM SOFTWARE, 2900 Monroe Ave, Rochester, NY 14618

For Detailed Order Information, refer to Page 17 of our 6-page Ad series(Pgs 7-17).

VISA MasterCard AMERICAN EXPRESS DISCOVER

To Place Credit Card Orders Call Toll Free 1-800-654-5244 (9am-8pm 7 days/week)

Technical Support (4-8pm), Order Status, Info, Technical Info; 716-383-8830

UPS 2ND DAY AIR

. . . Something Akin to a Miracle

I went to the roadshow version of the Broadway play *Beehive*, appearing here in Louisville a few weeks ago. Following the show, I got into a discussion with some of those who attended with me about how it was unfair to try to capsulize a decade into a neat little package.

Beehive is in effect a history of the 1960s, with an emphasis on the female singers of the decade. Since events in history obviously cannot be isolated from each other, the show included several references to historical events of that time.

I was somewhat disappointed by the play, contending that a decade is too long to survey in one fell swoop. Too much happens during that period of time.

Later I started thinking about computing and time. And here in the last year of the 1980s, I wonder whether we really consider what an amazing achievement Tandy Corporation brought about with its introduction of the Color Computer almost a decade ago.

First of all, the CoCo is the only computer to stand the test of a decade. While it is arguable that CoCo 3 is a different machine from the CoCo 1 or 2, I do not believe they are essentially different. In fact, the earliest programs that ran on the original CoCo have no trouble whatsoever running on the CoCo 3.

This is quite different from saying, for instance, that there is an Apple computer today just as there was then. Similarly, there was a Commodore (Pet) then; there is a Commodore computer now. Any resemblance between the versions, other than the name, is purely imagination.

Second, with its introduction and successive upgrading of the CoCo,

Programmer's Delight!

Pokes, Peeks and Execs are your guides into the jungle of computer programming. These commands give you the power of Machine Language without leaving the security of BASIC. Each book is a collection of "inside" information, with explanations and examples to help you immediately put it to use. Everyone from the novice to the professional will find these handy books a wealth of information.

300
POKES
PEEKS 'N EXECS
FOR THE COCO III

300 POKES, PEEKS, 'N EXECS for COCO III

- *40/80 column Screen Text Dump
- *Save Text/Graphics Screen to Disk
- *Command/Functions Disables
- *Enhancements for CoCo3 BASIC
- *128K/512K RAM Test Program
- *HPRINT Character Modifier

Only *$19.95*

500 POKES PEEKS,'N EXECS

- *Autostart your BASIC programs
- *Disable Color BASIC/ECB/Disk BASIC commands
- *Disable Break Key/ Clear Key/ Reset Button
- *Generate a Repeat-key
- *Transfer ROMPAKs to tape
- *Set 23 different GRAPHIC modes
- *Merge two BASIC programs
- *And much much more!!!

For CoCo 1,2 and 3. Only *$16.95*

ALL 3 BOOKS for $39.95

SUPPLEMENT TO 500 POKES,PEEKS, 'N EXECS

200 additional Pokes,Peeks and Execs (500 Pokes Peeks 'N Execs is a prerequisite)

- *ROMPAK transfer to disk
- *PAINT with 65000 styles
- *Use of 40 track single/double sided drives
- *High-speed Cassette Operation
- *Telewriter, CoCo Max enhancements
- * Graphics Dump (for DMP printers) /Text Screen Dump

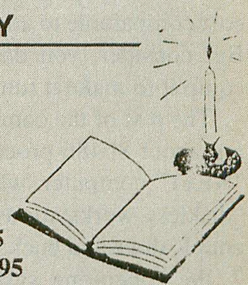
For CoCo 1,2 or 3. Only *$9.95*

UNRAVELLED SERIES

An invaluable aid for Basic and Machine Language programmers, these books provide a complete disassembly and annotated listing of the BASIC/ECB and Disk ROMs. These listings give complete, uninterupted memory maps of the four ROMs. Gain complete control over all versions of the color computer.

EXTENDED COLOR BASIC UNRAVELLED: COLOR BASIC and EXTENDED BASIC ROM Disassembly: **$39.95**
DISK BASIC UNRAVELLED: DISK BASIC ROM 1.1 and 1.0 Disassembly : **$19.95**
BOTH ECB AND DISK BASIC UNRAVELLED: $49.95
SUPER EXTENDED BASIC UNRAVELLED: SUPER EXTENDED BASIC ROM Disassembly for CoCo 3. **$24.95**
COMPLETE UNRAVELLED SERIES (all 3 books): $59.95

COCO LIBRARY



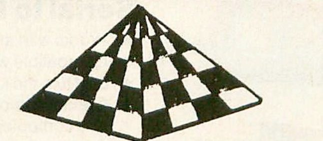
CoCo 3 Service Manual: **$39.95**
CoCo 2 Service Manual: **$29.95**
Start OS9 Book + Disk: **$32.99**
Inside OS9 Level II: ~~$39.95~~ **$19.95**
Rainbow Guide To OS9 Level II: **$19.95**
Rainbow Guide To OS9 II (disk): **$19.95**
Complete Guide To OS9 (Level 1): **$19.95**
Complete Guide To OS9 (2 Disk): **$29.95**
CoCo 3 Secrets Revealed: ~~$19.95~~ **$16.95**
Basic Programming Tricks: **$12.95**
Assembly Language Programming(tepco): **$18**
Addendum For CoCo3 (tepco): **$12**
Color Computer Disk Manual (with ref card): **$29.95**

Games

(All Games for CoCo 1,2,3 Disk unless specified)

Warrior King (CoCo 3): $29.95
In Quest of the Star Lord(CoCo3): $34.95 **Hint Sheet**: $3.95
Hall of the King 1,2,3: $29.95 ea **Trilogy**: $74.95
Pyramix (Cubix for CoCo 3): $24.95
Kung Fu Dude: $24.95
Dragon Blade: $19.95
Champion: $19.95
White Fire of Eternity: $19.95
Quest for the Spirit Stone (CoCo 3): $18
Wargame Designer II (CoCo 3): $29
TREASURY PACK #1: Lunar Rover Patrol, Cubix, Declathon, Qix, Keys of Wizard, Module Man, Pengon & Roller Controller. Only $29.95
TREASURY PACK #2: Lancer, Ms. Gobbler, Froggie, Madness & Minotaur, Ice Castles, Galagon, Devious. Only $29.95
SPACE PAC: Color Zap, Invaders, Planet Invasion, Space Race, Space War, Galax Attax, Anaroid Attack, Whirlybird, Space Sentry & Storm Arrows. Only $29.95
WIZARD's CASTLE: A hi-res graphics adventure game filled with tricks, traps and treasures. Only $19.95

DRAGONBLADE



4-D Chess

The ancient game of strategy movies into the future. Move your pieces through time as well as space. Req. RSDOS CoCo 3 & 2 Players. Disk Only $24.95

Speed Racer: Buckle your seatbelt and get ready to race in this Pole Position® type game. Only $34.95
Pinball Factory: Design, Build, Edit and Play the classic game of Pinball. Only $34.95
Demon Seed: Battle the flying, diving & bloodthirsty bats. Only $19.95
Cashman: Explosive color, fast-moving animation and amazing sound-effects! Has over 40 levels! $29.95
Fury: An action packed airborne dogfight simulation. $29.95
Time Bandit: Fight the Evil Guardians, Killer Smurphs & more. Full animation & over 300 screens. $29.95
Rommel 3D: Exciting 3-D Tank Combat Game. CoCo 2.$34.95
Outhouse: One of the funniest, most original games. Excellent graphics, sound effects & playability. $19.95
Mudpies: Crazy circus fun! Only $29.95

MICROCOM SOFTWARE, 2900 Monroe Ave, Rochester,NY 14618
For Detailed Order Information, refer to Page 17 of our 6-page Ad series(Pgs 7-17).

To Place Credit Card Orders Call Toll Free 1-800-654-5244 (9am-8pm 7 days/week)
Technical Support (4-8pm), Order Status, Info, Technical Info; 716-383-8830

VISA MasterCard AMERICAN EXPRESS DISCOVER

UPS 2ND DAY AIR

Tandy brought computing into more homes and to more people than anyone ever has before.

Now I know that is a strong statement to make, but I think it is true even though I cannot prove it — as you know, Tandy is not in the habit of releasing sales figures.

I *can* say it because I know of several years when Tandy sold out "to the bare walls." If you consider the number of its domestic stores alone and figure what an average inventory must be, you come up with a startling amount of computers sold.

Add to that the fact that the CoCo has never been an expensive computer. Yes, if you "fully equip" a unit, you end up with a cost comparable to an MS-DOS machine. But consider, you do not have to fully equip it to make it run — and run well.

The rest of the computer world is talking about 80486 processors; Steve Jobs' "NExT" computer, which costs $10,000; "diskless workstations" priced at *only* a couple thousand bucks; and good old OS-2, the "operating system of the future" (when *Presentation Manager* is finished, if ever). But every day, here at RAINBOW we have people taking the CoCo to new heights and actually hundreds of people every month being added to our ranks.

> ***". . . I wonder whether we really consider what an amazing achievement Tandy Corporation brought about with its introduction of the Color Computer almost a decade ago."***

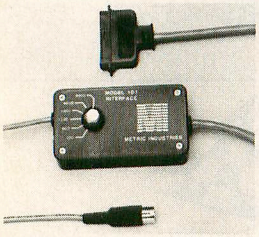
Every once in a while, I receive letters from people asking me where they can buy *Lotus 1-2-3* or some other well-known MS-DOS program for their Color Computers. I reply that they cannot, but they can buy an excellent spreadsheet for the CoCo, any of a number of outstanding word processors and fine desktop publishing programs, and so on.

If you have the bucks, you can get an excellent hard-disk setup for your CoCo. But wait. It isn't *essential* to have a hard disk to run anything, really. In counterpoint to that, try running *WordPerfect 5.0* in your average Tandy PC or compatible on a pair of floppy disks.

I believe, as I told my friends the night I saw *Beehive*, that a decade is too long to sum up in a few hours. But I can sum up the CoCo in one sentence: Considering the technology available at the time of its design, the CoCo is something akin to a miracle.

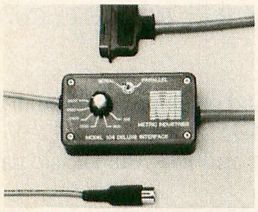
— Lonnie Falk

METRIC INDUSTRIES, INC.



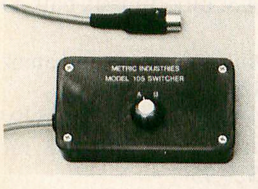
Model 101
Serial to Parallel Printer Interface

- ★ Works with any COCO
- ★ Compatible with "Centronics" Parallel Input Printers
- ★ Just turn the knob to select any one of 6 baud rates 300-9600
- ★ Comes complete with cables to connect to your printer and computer
- ★ Can be powered by most printers



Model 104 Deluxe Interface with "Modem Switch"

- ★ **Same Features as 101 Plus**
- ★ Built in Serial Port for your Modem or other serial device
- ★ Switch between Serial Output and Parallel Output
- ★ Comes with cables to connect to your computer and printer
- ★ Can be powered by most printers



Model 105 Serial Switch

- ★ Connects to your COCO to give you 2 switch selectable Serial Ports
- ★ Comes with a 3 foot cable to connect to your computer
- ★ Now you can connect your Printer (or printer interface) and your Modem (or other serial device) to your COCO and flip the switch to use either device
- ★ Does not require power

Cassette Label Printing Program

- ★ **New Version 2.1 prints 7 lines** of information on Cassette labels
- ★ Comes on Tape with instructions to transfer to disk
- ★ Menu driven, very easy to use
- ★ **Save and Load Labels from Tape and Disk**
- ★ Uses the features of your printer to print standard, expanded, and condensed characters
- ★ **Automatically Centers Each Line of Text**
- ★ Allows editing of label before printing
- ★ Program comes with 24 labels to get you started
- ★ 16K ECB required

Some of the Printers That Can –
Supply power for the 101 and 104 are Radio Shack, Star, Okidata, Brother, Juki, and Smith Corona.

Some of the Printers That Cannot –
Supply power for the interfaces are Epson, Seikosha, Panasonic, Silver Reed and NEC. If your printer cannot supply power to the interface you can order your interface with the "P" option or you can supply your own AC adapter. We recommend the Radio Shack 273-1431 AC adapter with a 274-328 connector adapter.

Write or call for more information or for technical assistance.

Price List

Model 101	**35.95**
Model 101P	41.95
Model 104	44.95
Model 104P	51.95
Model 105	14.95
Cassette Label Program	6.95
Pin Feed Cassette Labels:	
White	3.00/100
Colors (specify)	3.60/C
Red-Blue-Yellow-Tan	

4 Pin Din Serial COCO Cables:

Male/Male 6 foot	4.49
Male/Female 6 foot	4.49
Female/Female 6 foot	4.49
Other Lengths Available.	

All items covered by a 1 year warranty

Ordering Info

- ★ **Free Shipping** in the U.S.A. (except AK and HI) on all orders over $50
- ★ On orders under $50 please add $2.50 for shipping and handling
- ★ On orders outside the U.S.A. please write or call for shipping charges

You Can Pay By:

- ★ VISA or MasterCard
- ★ C.O.D. - add $2.25
- ★ Or send check or money order payable in U.S. funds

Metric Industries Inc.
P.O. Box 42396
Cincinnati, OH 45242

(513) 677-0796

512K BASIC

(For 128K & 512K Computers)

From the authors of Word Power 3.2, the best-selling Word Processor for CoCo 3, comes a revolutionary programming tool!

Do you have a 128K or 512K CoCo 3? Are you being told that you could only use 22K from Basic?? Don't believe it!!

Lets face it. You bought your CoCo 3 so you could get better graphics, more speed and more MEMORY. Unfortunately as it comes, the CoCo 3 only allows you to use 22K for Basic Programs. A big disappointment for Basic Programmers.

Introducing the revolutionary **512K Basic**. It gives you up to 80K Basic program/variable space (64K for Basic Program/16K for variables) on a 128K CoCo and over 400K (384K Basic Program Space & 16K Variable Space) on a 512K CoCo! There are no new commands to remember and approximately 90-95% of the existing Basic Software will run without any modifications. 512K Basic is completely transparent to the user. You won't even know its there until you realize that you were able to type in a massive Basic program without the dreaded ?OM Error. And **512K Basic** will even run at double clock-speed and automatically slow down for printer and disk operations.

Step up to **512K Basic.** It's the tool you need to tap the full potential of your CoCo 3. 512K Basic Requires a 128K or 512K CoCo 3 with a disk drive. OS9 is NOT required. Only **$39.95**

512K Upgrades for CoCo 3.

(Only $139 with purchase of 512K Basic)

Fully assembled, tested and ready to be shipped now.

Comes with $100 worth of 512K Software:

- 512K Backup Lightning
- 512K Print Spooler
- 512K Memory Test
- 512K Ramdisk
- OS9 Level II Ramdisk.

No soldering. Comes with all instruction manuals.

90 day warranty. New Low Price. Only ~~$159!~~

0K Upgrade Board: $39.95

Each 512K Upgrade tested 120 times before shipment!

KEYBOARDS , ETC.

KEYBOARD EXTENSION CABLE: Move your keyboard away from the computer & type with ease. Use your existing keyboard with this cable or leave your present keyboard intact and use a second keyboard. Only **$39.95.**

Cable with CoCo 2 Keyboard: $49.95
Cable with CoCo 3 Keyboard: $69.95
CoCo 3 Keyboard (with free FUNCTION KEYS software value $14.95)**:$39.95**
CoCo 2 Keyboard: $19.95

COMMUNICATIONS EXTRAVAGANZA

1) **Avatex 1200e Modem:** Fully Hayes compatible 300/1200 w/ speaker, Auto-Dial/Answer/Redial.
2) **MODEM CABLE:** 4 pin/DB 25 (Reg. $19.95)
3)**Autoterm Software:** (Reg $39.95)
4)**FREE** Compuserve Offer & Acess Time
5) **UPS 2nd Day Air Shipping**

Only $129.95

With Avatex 2400e instead of 1200e**: $229.95**

Avatex 1200e Modem Only: $85
Avatex 2400e Modem Only: $189

EPROM

INTRONICS EPROM PROGRAMMER (for CoCo): Programs 2516-27512 & more! Includes software & complete documentation. Latest version. Lowest Price Anywhere! Only **$137.95**

EPROM ERASER: Fast erase of 24/28 pin EPROMs. Only **$49.95**

BOTH EPROM PROGRAMMER & ERASER: $179.95

EPROMS: 2764-$8 27128-$9

ROMPAK (w/ Blank PC Board 27xx Series)**: $12.95**

BLANK CARTRIDGE (Disk Controller Size)**: $10.95**

ACCESORIES

5 1/4" DS/DD Disks: **$.40** each
3 1/2" DS/DD Disks: **$1.49** each
5 1/4" Disk Case (for 70 disks): **$9.95**
3 1/2" Disk Case (for 40 disks): **$7.50**

Curtis Printer Stand: **$19.95**
Surge Supresser Strip w/ 6 outlets: **$14.95**
Curtis Static Mat: **$24.95**

RIBBONS

NX1000 Color Ribbon: **$12.95**
NX1000 Black Ribbon: **$8.50**
Seikosha, EPSON, DMP, Panasonic, Okidata, Gemini Ribbons: **$8.50** each

CABLES

MAGNAVOX 8505/8515/8CM643 Analog RGB Cable: **$24.95**

SERIAL-TO-PARALLEL INTERFACE: Use your parallel printer at high speed (300-9600 baud) with CoCo. Comes will all cables. No software compatibility problems. Only **$44.95**

15" MULTIPAK/ROMPAK EXTENDER CABLE: $29.95

VIDEO DRIVER: Use a monochrome/color monitor with your CoCo 2. Comes with audio/video cables. Excellent picture quality/resolution! **$34.95**

RS232 Y CABLE: Hook 2 Devices to the serial port. Only **$24.95**

Y CABLE: Use your disk system with Speech Pak,CoCo Max, DS69, etc. **$27.95**

RGB Analog Extender Cable:$19.95
SONY Monitor Cable: $29.95
MODEM CABLE:4 pin to DB25.Only **$19.95**
2-POSITION SWITCHER: $29.95
HI-RES JOYSTICK INTERFACE: $11.99

CHIPS, ETC

Disk Basic Rom 1.1 (Needed for CoCo 3)**: $29.95 ECB ROM 1.1:$29.95**

68B09E or 6809E Chip: $14.95

MultiPak PAL Chip for CoCo 3: **$19.95**

PAL Switcher: Now you can switch between the CoCo 2 and 3 modes when using the Multi-Pak. You need the OLDER & NEW PAL chip for the 26-3024 Multipak. Only **$39.95**. With NEW PAL Chip: **$49.95.**

UPGRADES

64K Upgrade for CoCo I's, CoCo II's with Cat #26-3026/27, 26-3134, 26-3136: **$29.95**

64K Upgrade for 26-3134 A/B CoCo II: **$39.95**

(Free 64K Software incl. with 64K Upgr.)

MICROCOM SOFTWARE, 2900 Monroe Ave, Rochester,NY 14618

For Detailed Order Information, refer to Page 17 of our 6-page Ad series(Pgs 7-17).

To Place Credit Card Orders Call Toll Free 1-800-654-5244 (9am-8pm 7 days/week)

Technical Support (4-8pm), Order Status, Info, Technical Info; 716-383-8830

How To Read Rainbow

When we use the term CoCo, we refer to an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

The BASIC program listings printed in THE RAINBOW are formatted for a 32-character screen — so they *show up just* as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little disk and/or cassette symbols on the table of contents and at the beginning of articles indicate that the program is available through our RAINBOW ON DISK or RAINBOW ON TAPE service.

Using Machine Language

The easiest way to "put" a machine language program into memory is to use an editor/assembler, a program you can purchase from a number of sources. All you have to do, essentially, is copy the relevant instructions from *THE RAINBOW's listing* into CoCo.

Another method of putting an ML listing into CoCo is called "hand assembly" — assembly by hand, which *sometimes* causes problems with `ORIGIN` or `EQUATE` statements. You ought to know something about assembly to try this.

Use the following program if you want to hand-assemble ML listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I, VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the `&H3F00` in Line 10 to `&H7F00` and change the value of `I` to `&H7F80`.

OS-9 and RAINBOW ON DISK

The OS-9 side of RAINBOW ON DISK contains two directories: `CMDS` and `SOURCE`. It also contains a file, `read.me.first`, which explains the division of the two directories. The `CMDS` directory contains executable programs and the `SOURCE` directory contains the ASCII source code for these programs. BASIC09 programs will only be offered in source form so they will only be found in the `SOURCE` directory.

OS-9 is a very powerful operating system. Because of this, it is not easy to learn at first. However, while we can give specific instructions for using the OS-9 programs, you will find that the OS-9 programs will be of little use unless you are familiar with the operating system. For this reason, if you haven't "learned" OS-9 or are not comfortable with it, we suggest you read *The Complete Rainbow Guide to OS-9* by Dale Puckett and Peter Dibble.

The following is not intended as a course in OS-9. It merely states how to get the OS-9 programs from RAINBOW ON DISK to your OS-9 system disk. Use the procedures appropriate for your system. Before doing so, however, boot the OS-9 operating system according to the documentation from Radio Shack.

1) Type `load dir list copy` and press ENTER.
2) If you have only one disk drive, remove the OS-9 system disk from Drive 0 and replace it with the OS-9 side of RAINBOW ON DISK. Then type `chd/d0` and press ENTER. If you have two disk drives, leave the sytem master in Drive 0 and put the RAINBOW ON DISK in Drive 1. Then type `chd/d1` and press ENTER.
3) List the `read.me.first` file to the screen by typing `list read.me.first` and pressing ENTER.
4) Entering `dir` will give you a directory of the OS-9 side of RAINBOW ON DISK. To see what programs are in the `CMDS` directory, enter `dir cmds`. Follow a similar method to see what source files are in the `SOURCE` directory.
5) When you find a program you want to use, copy it to the `CMDS` directory on your system disk with one of the following commands:

One-drive system: `copy /d0/cmds/` *filename* `/d0/cmds/`*filename* `-s`

The system will prompt you to alternately place the source disk (RAINBOW ON DISK) or the destination disk (system disk) in Drive 0.

Two-drive system: `copy /d1/cmds/` *filename* `/d0/cmds/` *filename*

Once you have copied the program, you execute it from your system master by placing that disk in Drive 0 and entering the name of the file.

The Rainbow Seal

The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product that carries the Seal has actually been seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

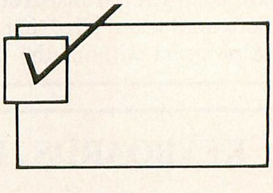
Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification.

The Seal is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

Rainbow Check Plus



The small box accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS*, type in the program and save it for later use, then type in the command `RUN` and press ENTER. Once the program has run, type `NEW` and press ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

MULTIPAKS

Adds 4 more expansion slots to your CoCo. Useful for RS232/Speech Packs, Hard Drive Interfaces & much more.

CoCo 2 Multipak (26-3124) : Only $89
CoCo 3 PAL Upgrade for
above Multipak: Only $19.95

Add $5.00 S&H. Please note that we have limited quantities of these Multipaks.

MPI Locking Plate (Spec Cat #): $8

COCO REPAIR SERVICE

Something wrong with your CoCo or your Multipak? We can help. We can repair your equipment at a very reasonable cost in the shortest possible time. Call 716-383-0026 for service information.

Other Products ....

DS69B Digitizer(with CSEE software): **$149.95**
Gravis Advanced Joystick: $59.95 ea
Magnavox BM7622 Amber Monitor & Cable:$99

MAGNAVOX 8CM515 RGB MONITOR

Razor-sharp picture quality for your CoCo! Has 14" screen, Analog/TTL RGB, Composite Inputs for CoCo 2/3, Speaker, tilt-stand & 2 year warranty! Only **$265** (add $12 S&H/$40 in Canada)

Magnavox RGB Cable for CoCo 3 and Composite Video / Audio Cable Set with purchase of monitor: **$19.95**

DISK DRIVES for CoCo 2 & 3

There are a lot of dealers selling disk drives for the CoCo. Why buy from us? **First**, all our drives are Brand New and made by Fujitsu. They are sleek, quiet and have a reputation of superb reliability. **Second**, our Drive 0 systems come with the acclaimed DISTO Controller - with gold-plated contacts. **Third**, our Drive 0 systems come with the **official** 200 page Radio Shack Disk Manual. **Fourth**, you get $60 worth of our utility software (Disk Util 2.1A & Super Tape/Disk Transfer) & our DISKMAX software which allows you to acess BOTH sides of our drives. Our drive systems are head & shoulders above the rest.

Drive 0 (With Disto Controller, Case, Power Supply, 1 Drive Cable, Manual, Software): **$209**
Drive 1 (With Case, Power Supply & software): **$129** Bare 5 1/4" Drive: **$89**
2 Drive System (With Disto Controller, Case, Power Supply, 2 Drive Cable, Manual & Software): **$309**
1 Drive Cable: **$16.95** 2 Drive Cable: $ **22.95** 4 Drive Cable:$ **34.95**

FD501 Upgrade Kit: **$109** (Includes Bare Drive, 2 drive Cable & Instructions)
FD502 Upgrade Kit: Call 716-383-8830 for pricing & availability.

HARD DRIVE SYSTEMS/ INTERFACES

Complete w/ Seagate Hard Drive, Hard Drive Controller, B&B Interface, Cables, Case, Power Supply, Software (HYPER IO) & Instruction manuals. Assembled/tested/formatted. Just *Plug'N'Run*. This is **the best** hard drive deal for the CoCo.

Seagate 20 Meg System: $509
Seagate 30 Meg System: $539

CoCo XT: Use 25-120 Meg Drives with your CoCo. Only **$69.95** w/ Real Time Clock: **$99.95**
CoCo XT ROM: Boots OS9 from hard/floppy. **$19.95**
HYPERIO: Allows Hard Drive Use with RSDOS. Only **$29.95**
HYPER III: Adds RAMDISK & Spooler to HyperIO .**$12.95**
HYPERIO: Disto Version:If you have the Disto Hard Drive Interface, this program will allow you to use your Hard Drive from RSDOS!! Only **$29.95**

PRINTERS

All Printer Systems include 1000 FREE sheets of paper!

NX1000 Rainbow System: NX1000 Color Printer w/144 CPS draft • Friction/Tractor Feed • Epson/IBM Compatible • Paper Parking • 1 Year Warranty. Only **$289**

NX1000 System: NX1000 Printer w/ 144 cps Draft • Friction / Tractor Feed • Paper Parking • Epson/IBM Compatible • 1 Year Warranty. Only **$199**

Star NX2400 System: 24-pin Printer • Tractor/Friction Feed • Epson/IBM Compatible • Paper Parking • 1 Year Warranty. Only **$399**

NX-15 System: 9-pin Printer • Wide Carriage • High speed draft printing • 1 Year Warranty: **$399**

DISTO PRODUCTS ...

Disto Mini Controller: **$74.95**
Disto Super Controller: **$99.95**
Disto Super Controller II: **$129.95**

- Mini Eprom Programmer Add on: **$54.95**
- Hard Disk Inter.:**$39.95** w/RS232: **$69.95**
- RT Clock & Parallel Interface: **$34.95**
- MEB Adapter Add On: **$34.95**

MULTI-BOARD ADAPTER: Printer Port, RT Clock & true RS-232 Serial Port. **$74.95**
RS232 SUPER PACK: True RS-232 Port for your CoCo. Compatible with Tandy® Deluxe RS232 Pack. Includes DB25 Cable. Requires Multipak. **Only $54.95**
4-in-1 Board: Its here! **$Call**

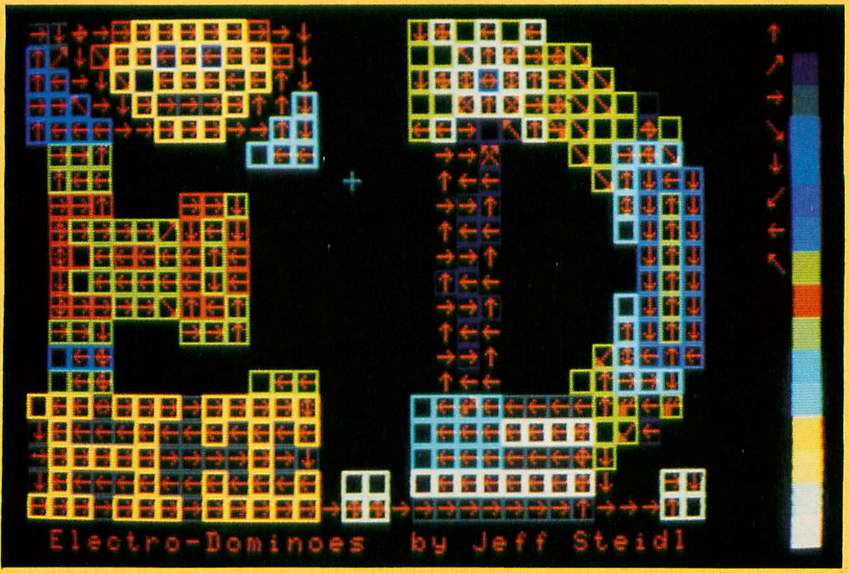
MICROCOM SOFTWARE 2900 Monroe Avenue • Rochester, NY 14618
To Order: All orders $50 & above (except Printers, Monitors, Drives, Computers) shipped by **UPS 2nd Day Air** in the Continental US. We accept Visa,MC, Amex,Discover,Check & MO. Please add $3.00 for S&H (Drives/Printers add $10 S&H); COD accepted within Continental US for books & software under $100 ($5 extra COD Charge); foreign add 10% S&H (min $5). NYS Residents add sales tax. Our Australian Agent: Aust. Peripheral Development Ph:07-208-7820.

Credit Card Toll Free Order line 1-800-654-5244 (9am-8pm 7 days/week)
Order Status, Info , Technical Support (4-8pm): (716)383-8830; Fax (716) 383-0026

A new domino theory — put it on a CoCo and it will be faster, more fun and much more colorful

Electro Dominoes

By Jeff Steidl



Have you ever spent hours setting up dominoes, only to accidentally knock them down and have to start all over? Then, when you finally finish, you only get to watch them fall once. Maybe you don't have as many different colored dominoes as you would like, so watching them fall isn't too exciting.

Electro-Dominoes solves these problems and comes in the form of a very compact and powerful BASIC program. After running the program, there is a pause before the main workscreen appears. Here, you can select an arrow or color with the joystick, placing the dominoes wherever you want. The color represents that on the sides of the dominoes, so when the domino falls, it turns that color. The arrow shows which direction the domino will fall — each domino can have up to two arrows in it. This allows as many as 16 paths of falling dominoes. To get rid of an arrow already on the screen, select the same direction arrow and delete it with the joystick.

After all of the dominoes are set up, you can knock them down. (Don't run out and get everyone to see it now, wait until you have debugged your setup.) Move the cursor over the domino you want to knock down and press H. Then enter a number (0 to 15) for the top color of the dominoes. The computer draws your dominoes as seen from above, and beeps. You can now press the up-arrow to start the reaction.

On the first run there is a good chance of having a bug in the works. Most often, it involves a group of dominoes that don't fall. This is caused by forgetting an arrow or pointing one to the wrong place. Another problem is the *endless loop*. This is caused by a group of arrows in which the last points to the first. To get out of an endless loop, do exactly what you do in BASIC; press BREAK.

The last error is more subtle. When two arrows point to the same domino, the computer not only remembers the domino (and all the ones that it knocks down) falling once, but twice. This slows down the program some so, if you suspect it, double-check the workscreen. After watching the dominoes fall, press H or R to return to the workscreen.

If you break out of the program to do the impossible, end an endless loop, or just to do a directory, you can get back into the program by typing `GOTO 1`. The workscreen, as well as your domino setup is restored. To save a setup, press S and enter

---

Jeff Steidl spends much of his time writing BASIC and assembly language programs as well as designing computer systems and languages. He has eight years of programming experience, ranging from MC-10 to VAX. Jeff's other interests include mathematics, music and electronics.

3 Fabulous Bargains!

These specials will be withdrawn without notice. Don't miss them!

Max-10™

The Dazzling Word Processor

$39 95

Max–10: the Rolls–Royce of word processors. The only one with true graphic capability and dozens of type styles. Using your dot matrix printer you get from tiny footnotes (6 point) to big titles (24 point).

The *Rainbow* review (1/89) said: **"An incredible job of providing power, flexibility and speed in a program that is as easy to use as it is to pronounce! ... Max–10 takes a back seat to none, and is beyond comparison with most."** Max–10, the only word processor with **"What You See Is What You Get"**. A word processor you will love at first sight.

CoCo Max III

The Famous Graphics Creator

$49 95

CoCo Max III: now a classic and probably the most popular CoCo program ever. If the price was the reason that stopped you before, this *special* will delight you. Listen (*Rainbow* 3/88): **"There are no limits to what you can do with this fabulous program. Speed, ease, animation, power and color, all in one package. CoCo Max III is the ultimate program for the CoCo 3."** Check any Rainbow (up to 4/89) for complete info on CoCo Max.

To top it off, we include a free **Demo Disk** plus the super **CoCo Show** program, which lets you make your own "slide shows".

Save $70

BOTH

CoCo Max III and **Max–10** for only

$79 95

Desktop Publishing: together, **CoCo Max III** and **Max–10** form an unbeatable system for reports, flyers, invitations, greeting cards, signs, newsletters, etc. It's far beyond anything you've ever seen on a CoCo.

Here is one of the hundreds of unsolicited letters we got: **"Max–10 and CoCo Max III are wonderful. They are the first Color Computer products I have purchased that were even better than I hoped for."**

At **Colorware**, we all work hard to make you feel that way and we thrive on your appreciation.

About Max–10

What the CoCo Community needs is a word processor that's rock solid, blindingly fast, feels like a Macintosh, makes all the others look boring, and does not cost $80

Max–10 is just that and more. It allows on screen mixing of graphics and text, large headlines, multiple columns and full page preview (with graphics).

We swear that Max–10 will add excitement to your word processing, and that's no small task!

PRINTERS SUPPORTED: EPSON FX,MX,RX,LX AND COMPATIBLES; DMP 105,106,110,130; CGP220 (B&W); OKI 182,92,192; STAR NX-10, NX-1000.

Max–10 Add–ons

– **Max–10 Fonts**. 36 super fonts on 2 disks. Send for list. Order #C–23 .... **$29.95**

NOTE: Max–10 and CoCo Max Fonts aren't interchangable.

– **Spell Checker** 50000 word dictionary for online spell checking and dictionary lookup. Perfect seamless integration with Max–10. Order #C–24.................................... **$29.95**

System Requirements

Max–10 and CoCo Max III Require: any CoCo 3; 1 or more disk drives; joystick or mouse; Radio Shack or Colorware Hi–Res Pack;a video or RGB monitor or a TV.

About CoCo Max III

Whether you doodle for fun or do graphics for a living, **CoCo Max** will amaze you. It's a promise.

Its major features include: Huge picture area (2 full hi–res 320x192 screens). Large editing window. **Zoom** mode for detail work. 28 point and click drawing tools. Shrink and stretch. **Rotation** at any angle (1.5° steps). 512K memory support (all features work with 128K too). Undo (Oops) feature to fix mistakes. **Animation**. Special effects. Color sequencing (8 colors, variable speed). 13 fonts (more available). Each font has 8 sizes and 5 styles for thousands of possible combinations. Translate program to convert most types of pictures. **CoCo Show** "slide show" program. Miniload program to help use pictures with your software. Color editing of patterns. Prints in single or double size. Select 16 of 64 available colors, all 64 colors are shown at once for easy selection. Pull–down menus. **40 paint brush** shapes. Two color lettering. Spray can. Amazing "flowbrush". RGB and composite monitor support. Colors print in 5 shades of gray.

PRINTERS SUPPORTED: EPSON RX,FX,MX,LX AND COMPATIBLES; STAR/GEMINI NX-10,NX-1000; DMP100,105,106,110,120,130,200; OKI 82A,182,192; CGP-220(B&W)

Color Drivers available. See next column.

CoCo Max III Add–ons

– **Max Fonts** disks. 95 fonts on 4 disks. Order #C–73...................................... **$49.95**

– **Max Edit** Create new fonts or edit existing ones. Order #C–16 .... **$19.95**

– **Color Printer** drivers for NX–1000 Rainbow (#C–2), CGP–220 (#C–1) or Okimate 20 (#C–3)...... .... each **$19.95**

CoCo Max I and II

– **CoCo Max I on tape**. See previous ads or write for info. For CoCo 1 or 2. Order #C–7...................................... **$59.95**

– **CoCo Max II**. For all disk CoCos. Multi–pak or Y–Cable required. #C–85....... **$69.95**

Digitizers

Digitize any picture from any video source (VCR, camera...) for use with CoCo Max III and Max–10.

DS–69. Requires Multipak. 2 pictures per second. Order #C–18....................... **$99.95**

DS–69B Faster. 8 pix/sec. #C–92... **$149.95**

Call or Write Now

VISA (203) 348–9436 MasterCard

Weekdays 9-5 EST

Ordering Information: We accept Visa, Mastercard, Checks, and M.O. C.O.D. is $4 extra. Purchase orders are subject to credit approval. CT residents add 7.5% sales tax.

Shipping: $4 per order (usually UPS ground). UPS 2nd Day Air: $4 extra. Next Day service available. Canada: $6 per order (Airmail). Outside US and Canada: Add 10% of order total.

COLORWARE

COLORWARE
242-W West Avenue
Darien, CT 06820

a filename; to load a setup, press L and enter the filename. To change dominoes in order to use a cassette system, change all occurrences of `#W` in lines 4, 10 and 11 to `#V`. (Make sure to have the auxiliary chord plugged in, and when saving, press the Record and Play buttons on the recorder *before* you press ENTER.) The program runs at double speed, except during file manipulations. The palette colors may be altered by changing the first 16 DATA values in Line 23. Warning: Changing a BASIC line statement erases your setup — save it first!

(Questions or comments concerning this article may be directed to the author at 605 Evergreen, Holmen, WI 54636. Please include an SASE when requesting a reply.)

Editors Note: A sample file, DOMINO.SAM, *is included on this month's* RAINBOW ON DISK. *To use the sample, press L after running* DOMINOES *and follow the directions given in the article .*

The Listing: DOMINOES

```
0 CLEAR999:PCLEAR1:F=65497:POKEF
,O:Z=15:FORY=0TOZ:READA:PALETTEY
,A:NEXT:CLS1:E=599:DIMA(Z),B(Z),
C(E),D(8),E(E),F(E),R(E),S(E),X(
E),Y(E):G=30:FORP=0TOE:X(P)=(P-I
NT(P/G)*G)*9:Y(P)=INT(P/G)*9:R(P
)=X(P)+8:S(P)=Y(P)+8:NEXT:FORN=1
TO8:READA$(N),D(N):NEXT
1 W=1:HBUFFW,39:T=65312:V=-1:U=2
52:H=74:I=2:J=7:L=3:Q=12:R=8:S=6
5496  ' COPYRIGHT 1989  FALSOFT,
INCORPORATED
2 POKEF,O:HCOLORR,O:HSCREEN2:FOR
A=0TOJ:HDRAW"BM296,"+STR$(A*Q)+A
$(A+W):NEXT:FORP=0TOZ:HCOLORP:HL
INE(308,P*Q)-(319,P*Q+11),PSET,B
F:NEXT:IFK=0THENK=W:GOTO4
3 FORX=0TOE:HCOLORC(X):HLINE(X(X
),Y(X))-(R(X),S(X)),PSET,B:A$="C
8BM"+STR$(X(X))+","+STR$(Y(X)):H
DRAWA$+A$(E(X)):HDRAWA$+A$(F(X))
:NEXT
4 CLOSE#W:POKEF,O:HLINE(R,184)-(
263,191),PRESET,BF:HCOLORR:HPRIN
T(1,23),"Electro-Dominoes  by Je
ff Steidl"
5 A=INT(JOYSTK(O)/I):B=JOYSTK(W)
/63:IFA<G THENM=O:B=INT(B*19):X=
A+B*G:A=A*9:B=B*9ELSEB=INT(B*Z)*
Q:IFA>G THENM=I:A=308ELSEA=296:M
=W:IFB>84THENB=84
6 HGET(A,B)-(A+J,B+J),W:HCOLORRN
D(Z):HDRAW"BM"+STR$(A)+","+STR$(
B)+"BD4BR1R6L3U3D6":A$=INKEY$:IF
A$="H"THEN15ELSEHPUT(A,B)-(A+J,B
+J),W:IFA$="S"THEN10ELSEIFA$="L"
THEN11
7 IFBUTTON(O)THENIFM=2THENC=B/Q:
M1=O:GOTO9ELSEIFM THEND=B/Q+W:M1
=W:GOTO9ELSEIFM1=0THENHCOLORC:HL
INE(A,B)-(R(X),S(X)),PSET,B:C(X)
=C:GOTO5ELSEIFD=E(X)THENE(X)=F(X
):F(X)=0ELSEIFD=F(X)THENF(X)=0EL
SEIFE(X)=0THENE(X)=D ELSEF(X)=D
ELSE5
8 HLINE(A+W,B+W)-(A+J,B+J),PRESE
T,BF:A$="C8BM"+STR$(A)+","+STR$(
B):HDRAWA$+A$(E(X)):HDRAWA$+A$(F
(X)):SOUND200,W
9 IFBUTTON(O)THEN9ELSE5
10 N$=" Save:":GOSUB12:POKES,O:O
PEN"O",#W,N$:FORY=0TO525STEP75:P
OKEF,O:A$="":FORX=Y TOY+H:A$=A$+
CHR$(E(X)+H)+CHR$(F(X)+H)+CHR$(C
(X)+H):NEXT:POKES,O:WRITE#W,A$:N
EXT:GOTO4
11 N$=" Load:":GOSUB12:POKES,O:O
PEN"I",#W,N$:FORY=0TO525STEP75:I
NPUT#W,A$:POKEF,O:N=W:FORX=Y TOY
+H:E(X)=ASC(MID$(A$,N,W))-H:F(X)
=ASC(MID$(A$,N+W,W))-H:C(X)=ASC(
MID$(A$,N+I,W))-H:N=N+L:NEXT:POK
ES,O:NEXT:GOTO2
12 HCOLORO:HLINE(R,184)-(263,191
),PSET,BF:HCOLORR:A=18:HPRINT(Q,
23),N$:N$=""
13 A$=INKEY$:IFA$=CHR$(13)THENRE
TURNELSEIFA$=CHR$(R)ANDA>18THENH
COLORO:N$=LEFT$(N$,A-19):A=A+V:H
LINE(A*R,184)-(A*R+J,191),PSET,B
F:ELSEIFA<G ANDA$>""THENHCOLORR:
HPRINT(A,23),A$:N$=N$+A$:A=A+W
14 GOTO13
15 N$="Color:":GOSUB12:HSCREENI:
HCOLORVAL(N$):FORY=0TOE:IFE(Y)OR
C(Y)THENHLINE(X(Y),Y(Y))-(R(Y),S
(Y)),PSET,B
16 NEXT:N=O:A(O)=X:SOUND200,W:PO
KET+L,63
17 IFINKEY$<>"^"THEN17
18 P=V:FORA=O TON:Y=A(A):HCOLORC
(Y):HLINE(X(Y),Y(Y))-(R(Y),S(Y))
,PSET,BF:IFE(Y)THENP=P+W:B(P)=Y+
D(E(Y)):IFF(Y)THENP=P+W:B(P)=Y+D
(F(Y))
19 NEXT:POKET,U:IFP=V THEN22
20 N=V:FORA=O TOP:Y=B(A):HCOLORC
(Y):HLINE(X(Y),Y(Y))-(R(Y),S(Y))
,PSET,BF:IFE(Y)THENN=N+W:A(N)=Y+
D(E(Y)):IFF(Y)THENN=N+W:A(N)=Y+D
(F(Y))
21 NEXT:POKET,O:IFN>V THEN18
22 A$=INKEY$:IFA$="H"THEN15ELSEI
FA$="R"THEN2ELSE22
23 DATA,1,7,9,10,12,14,16,32,21,
28,31,52,54,58,63,BD7BR4U6NF2G2,
-30,BD7BR1E6NL2D2,-29,BD4BR1R6NH
2G2,1,BR1BD1F6NU2L2,31,BR4BD1D6N
E2H2,30,BR7BD1G6NU2R2,29,BR7BD4L
6NE2F2,-1,BR7BD7H6NR2D2,-31
```

VISA

<<< GIMMESOFT >>>

MasterCard

A new generation of Color Computer products

MAXSOUND

RAINBOW CERTIFICATION SEAL

A High Quality Digital Audio Sampler and Sequencer

Turn your CoCo III into a REAL digital audio sampler with HIGH quality audio reproduction. Easily add exotic effects, ECHO, stuttering, speed shifting, sequencing, and reverse audio to BASIC or ML programs or GRAPHICS! Now includes Data Compression. Imagine recording any Voice, Music, or Sound effect and being able to use these DIGITAL recordings in your own programs! 3 disk sides includes: INTERFACT/BIN - ML driver for sound effects. G&M/BAS - Adds sound effects to Graphics. SHOWTIME and DEMO disks. SCOPE/BAS - Turns CRT into a Digital Oscilloscope to look at MAXSOUND waveforms. Version 3.0 upgrade (Includes improved ECHO and the ability to print NAMETAGS and locations to the screen and/or printer) ..... $6.95 + Shipping & Handling

Call to hear 'OVER THE PHONE' Demo - 9am to 9pm VOICE only.
DOWNLOAD Demo Files 300/1200/2400 24 hrs - 301-675-7626 MODEM only.
Requirements .... (128k or 512k CoCo III only) DISK $59.95

Games

See previous Rainbow ads
for complete descriptions.

Warrior King	$29.95
In Quest of the Starlord	$34.95
Kung-Fu Dude	$24.95
Pyramix	$19.95
Hall of the King I,II or III each	$29.95
Dragon Blade	$19.95

Utilities

Fkeys III	$19.95
Sixdrive	$16.95
Multi-Label III	$16.95
AD&D Companion	$24.95
MPI-CoCo Locking Plates 26-3024 or 26-3124	$ 7.95

VER. 3

V-Term Terminal Emulator

RAINBOW CERTIFICATION SEAL

Communicate with VAX, UNIX, Mainframe, and BBS Systems!

-VT-100, VT-52, Vidtex (includes RLE graphics display), and standard CRT emulations.
-Menus can be operated concurrently with other terminal functions. (Disk Basic!)
-Full 28 line by 80 column screen, with 3 bottom lines protected for menus.
-Serial port up to 2400 baud, RS-232 Pak up to 19,200 baud, DCModem Pak at 300 baud.
-XModem, XModem-CRC, Y-Modem, and ASCII file transfers directly to disk or memory.
-RAMDISK like buffer, Capture buffer, Snapshot, Conference mode, and 35/40/80 Tracks.

NEW FEATURES: 15-Entry autodialer, 10 Programmable macro keys for each system, compatible with Hyper I/O and RGBDOS harddrive systems, and baud rates up to 19,200!

Version 03.00.00 upgrade ...... $6.95 + S&H   Disk (128k or 512k CoCo III only) $39.95

Telepak II

(CoCo I/II/III) **A TRULEY COMPATIBLE RS-232 INTERFACE!**

Now, from Orion Technologies, comes the answer to the continuing demand for an RS-232 interface. Telepak II now includes a 3 foot DB25 cable, gold card edge contacts, and low power drain (5v) components. Works on ALL Color Computers with or without a Multi-Pak interface. (MPI required on disk systems) Baud rates up to 19,200! (19.2 tested using V-TERM ver 3). Only $49.95

Toll Free 1-800-441-GIME Order Line

Technical assistance: 7pm to 9pm
Orders: 9am to 9pm Eastern time
On-line orders and up to date information: Delphi's CoCo Sig

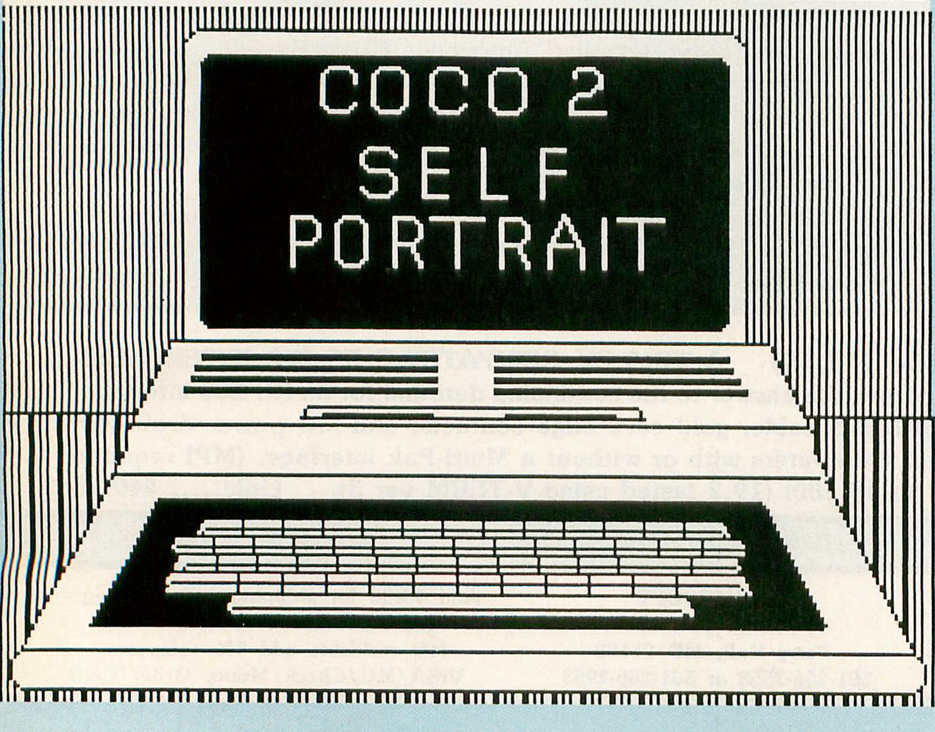
GIMMESOFT
P.O. Box 421
Perry Hall, MD 21128
301-256-7558 or 301-256-2953

Add $3.00 for shipping and handling
Add $3.00 for COD (USA only)
MD residents add 5% sales tax
VISA/MC/Check/Money Order/COD

See your CoCo 2 in a new way

A Tribute to the CoCo 2

By James A. Tatarka



For years, I have used my trusty CoCo 2 to write tests and create designs. My faithful computer has helped me to invent designs and pictures guaranteed to interest my students and amuse me. CoCo has followed me through my artistic efforts, patiently waiting until I got my creation just right.

Self Portrait is a tribute to my uncomplaining CoCo 2. Using 16K Extended Color BASIC, this program creates a miniature CoCo 2 on the computer screen. Once the portrait is complete, the miniature CoCo's screen displays its name. The portrait's screen is then erased, and the miniature CoCo exhibits its educational value by presenting a visual aid for a lesson on Einstein's theory of relativity. Once the lesson is over, CoCo's portrait entertains its captivated audience with a juggling act.

I expect to use my CoCo 2 for many years to come. Its graphic capabilities will help me to entertain my students and myself, and I hope that my salute to my CoCo 2 has amused you as well.

(Questions or comments regarding this program may be addressed to the author at 25 Manchester, Youngstown, OH 44509. Please enclose an SASE when requesting a reply.) ☐

James Tatarka has taught the sixth grade for 23 years and holds an MS in elementary education. He has had his CoCo 2 for five years and enjoys using it as a classroom aid.

Dr. Preble's Programs Since 1983

DPP
Since 1983

Pyramix

This fascinating CoCo 3 game continues to be one of our best sellers. ***Pyramix*** is 100% machine language written exclusively to take advantage of all the power in your 128K CoCo 3. The Colors are brilliant, the graphics sharp, the action fast. Written by Jordan Tsvetkoff and a product of ColorVenture.

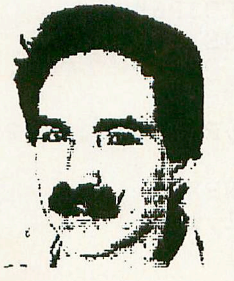
The Freedom Series

Vocal Freedom

I've got to admit, this is one nifty computer program. ***Vocal Freedom*** turns your computer into a digital voice recorder. The **optional Hacker's Pac** lets you incorporate voices or sounds that you record into your own BASIC or ML programs. This is not a synthesizer. Sounds are digitized directly into computer memory so that voices or sound effects sound very natural. One "off-the-shelf" application for Vocal Freedom is an **automatic message minder.** Record a message for your family into memory. Set Vocal Freedom on automatic. When Vocal Freedom "hears" any noise in the room, it plays the pre-recorded message! Disk operations are supported. VF also tests memory to take advantage of from 64K up to a full 512K. Requires low cost amplifier (RS cat. #277-1008) and any microphone.

Mental Freedom

Would your friends be impressed if your computer could **read their minds?** Mental Freedom uses the techniques of Biofeedback to control video game action on the screen.**Telekinesis?** Yes, you control the action with your thoughts and emotions. And, oh yes, **it talks** in a perfectly natural voice without using a speech synthesizer! Requires Radio Shack's low cost Biofeedback monitor, Cat. #63-675.



BASIC Freedom

Do you ever type in BASIC programs, manually? If you do, you know it can be a real chore. Basic Freedom changes all that. It gives you a **full screen editor** just like a word processor, but **for BASIC programs.** Once loaded in, it is always on-line. It hides invisibly until you call it forth with a single keypress! This program is a must for programers or anyone who types in programs. By Chris Babcock and a product of ColorVenture.

Lightning Series

These three utilities give real power to your CoCo 3.

Ramdisk Lightning

This is the best Ramdisk available. It lets you have up to 4 mechanical disk drives and **2 Ram drives on-line** and is fully **compatible with our printer spooler** below.

Printer Lightning

High capacity **print spooler for CoCo 3.** Load it and forget it--except for the versatility it gives you. Never wait for your printer again! Printer runs at high speed while you continue to work at the keyboard! Will operate with any printer you have already hooked to your CoCo.

Backup Lightning

This utility requires 512K. Reads your master disk once and then makes superfast multiple disk backups on all your drives! **No need to format blank disks first!** Supports 35, 40 or 80 track drives.

COCO Braille

Produce standard grade 2 Braille on a Brother daisy wheel printer. Easy to use for sighted or blind user. **No knowledge of Braille is necessary.** Call for free sample. The raised dots produced are easily touch readable by the blind. The print-to-braille algorithm is robust with errors rarely being made--and, it has the ability to learn!

Prices

CoCo 3 only

Ram Disk Lightning, Disk	$19.95
Printer Lightning Disk	$19.95
Backup Lightning, Disk	$19.95
All three, Disk	$49.95
Pyramix, Disk	$24.95

CoCo 1,2, or 3

Vocal Freedom, Disk	$34.95
Vocal Freedom Hackers Pac	$14.95
COCO Braille	$69.95

CoCo 2 or 3 only

Mental Freedom Disk	$24.95
Basic Freedom, Disk	$24.95

CoCo 1 or 2 only

VDOS, The Undisk, a menu operated ramdisk for the CoCo 1 or 2. LOAD, SAVE, KILL, DIRECTORY, are all supported. Tape........$24.95

VDUMP, backup Undisk files to single tape file. Tape........$14.95

VPRINT, Print Undisk directory, Tape........$9.95

We Ship FAST!

Add $2.50 shipping/handling in USA or CANADA

Add $5.00 to ship to other countries

Dr. Preble's Programs
6540 Outer Loop
Louisville, KY 40228
24 Hour Order Line

Visa, MasterCard, COD, Check

☎ **(502) 969-1818**

The Listing: PORTRAIT

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 '***** COCO-2 SELF PORTRAIT *
15 '*****    BY J.A.TATARKA     *
20 '*****     25 MANCHESTER     *
30 '*****   YOUNGSTOWN, OHIO    *
40 '*****    ZIP CODE 44509     *
50 D=0
60 PMODE4:PCLS1:SCREEN1,1
70 DRAW"C0BM6,188R244E3U5H3NL244
UHUHUHUHUHUHUHUHUHUHUHUHUHUHUH
UHUHUHUHUHUHUHUHRUHUHUHUHU5H2L18
5G2D5GDGDGDGDBU15BR5EUEUEUEUEUEU
EUEUEUEUEUER163FDFDFDFDFDFDFDF
DFDFD
80 DRAW"BM6,188H3U5E3UEUEUEUEUEU
EUEUEUEUEUEUEUEUEUEUEUEUEUEUEUEU
EUEUEER193
90 DRAW"BM50,90U80E4R146F4D80"
100 LINE(55,95)-(119,96),PSET,B:
LINE(53,98)-(119,99),PSET,B:LINE
(52,101)-(119,102),PSET,B:LINE(1
35,95)-(199,96),PSET,B:LINE(135,
98)-(200,99),PSET,B:LINE(135,101
)-(202,102),PSET,B
110 LINE(50,104)-(119,105),PSET,
B:LINE(135,104)-(204,105),PSET,B
120 DRAW"BM82,112EUER90FDFL94BR6
BUR30BR20R30
130 DRAW"BM55,85U70E2R140F2D70G2
L140H2"
140 DRAW"BM26,170R199EHUHUHUHUHU
HUHUHUHUHUHUHUHUHUHUHUHHL165GDGD
GDGDGDGDGDGDGDGDGDGDGDGDGDGDG
150 DRAW"BM61,167R130HUHUHUL124G
DGDGDERER122FRF
160 DRAW"BM47,155R156FDFDFDL163E
UEUEUBL2BD6E3R155F3
170 DRAW"BM45,150R160
180 DRAW"BM48,145R155
190 DRAW"BM55,140R142
200 DRAW"BM45,140BR8BD5UEUEUBR11
ND5BR11ND5BR11ND5BR11ND5BR11ND5B
R11ND5BR11ND5BR11ND5BR11ND5BR11N
D5BR11ND5BR11ND5BR11DFDFD"
210 DRAW"BM54,145E2R141F2"
220 DRAW"BM48,145GDGDGBR13NU5BR1
1NU5BR11NU5BR11NU5BR11NU5BR11NU5
BR11NU5BR11NU5BR11NU5BR11NU5BR11
NU5BR12NU5BR12NU5BR13UHUHU"
230 DRAW"BM46,150E2R155F2"
240 DRAW"BM49,150GDGDGBR13NU5BR1
1NU5BR11NU5BR11NU5BR11NU5BR11NU5
BR11NU5BR11NU5BR11NU5BR11NU5BR11
NU5BR20NU5BR12BU5FDFDF"
250 DRAW"BM49,155E2R150F2"
260 DRAW"BM45,160U5BR20D5BR12U5B
R12D5BR12U5BR12D5BR12U5BR12D5BR1
2U5BR12D5BR12U5BR12D5"
270 '
280 POKE178,0:PAINT(60,40), ,0:P
AINT(40,150), ,0
290 DRAW"C0;BM0,111R35":DRAW"BM2
20,111R35"
300 POKE178,1:PAINT(0,0), ,0
310 POKE178,254:PAINT(1,179), ,0
320 DRAW"C1BM97,20U2H2L5G2D8F2R5
NE2BR9H2U8E2R5F2D8G2NL5BR11H2U8E
2R5F2D2BD6G2L5BR16H2U8E2R5F2D8G2
L5BR20NR9U3E2R3E2RU3H2L4GD"
330 DRAW"C1BM108,40H2L5G2D2F2R5F
2D3G2L5H2BD2BR17U13NR6BD6NR6BD7R
6BR10NU13R6BR10U13NR6BD6R6
340 DRAW"C1BM80,70U13R5F2D3G2L4B
D6BR13H2U9E2R4F2D9G2NL4BR10U13R5
F2D3G2LNL3FDFDFDBR10U13NL7R7BD13
BR5U13R5F2D3G2LNL3FDFDFDBR6U6NR6
EUEUEUEUFDFDFDFDFD5"
350 DRAW"BR6NU13BR10U13NL6R6"
360 FORR=1TO3000:NEXT
370 IFD=5THENGOSUB550
380 IFD=3THENGOSUB570
390 IFD=7THENGOSUB610
400 PAINT(60,40),1,1
410 IFD=4THENGOSUB680
420 IFD=10THENGOSUB610
430 IFD=13THENGOSUB680
440 IFD=9THENGOSUB610
450 IFD=12THENGOSUB570
460 IFD=14THENGOSUB610
470 IFD=17THENGOSUB680
480 PAINT(60,60),1,1
490 IFD=4THENDRAW"C0BM55,55R144"
500 DRAW"C0BM55,85U70E2R140FD70G
2L140H2"
510 D=D+1:POKE178,D:PAINT(60,85)
, ,0
520 IFD=3THENGOSUB550ELSEIFD=5TH
EN GOSUB570ELSEIFD<255THEN400
530 IFD<255THEN400
540 GOTO50
550 FORR=2TO30:CIRCLE(120,47),R:
NEXT
560 RETURN
570 COLOR0:LINE(90,30)-(150,65),
PSET,BF
580 DRAW"C1BM95,60NR7U6NR7U6R7BR
3BD4R5BD3NL5BD5BR3U12F4DFDFEUEUE
4D12BR12L4H2UHU5E3R4FDFDBD4DG2BU
11BR7E2R2F2DGLGLGLD3R6"
590 FORR=1TO3000:NEXT
600 RETURN
610 FORR=1TO33
620 CIRCLE(90,60),R,1.555,.422,0
630 NEXT
640 FORR=1TO2500:NEXTÖ
650 PAINT(60,40),1,1
660 RETURN
670 PMODE4:RETURN
680 PMODE4:SCREEN1,1
690 RETURN
```

It's Word Processor Trade-in Time Again!

Send us ANY word processor and get VIP Writer III for $49.95!

Include $3 for shipping. Send $52.95 and your old word processor to the address below. Offer expires 9/15/89 so Hurry!

VIP Writer III Ver. 2 ✻Cat. #90-908

VIP Writer III offers screen widths of 32, 40, 64 & 80 - all with 24 lines and actual lower case letters using the CoCo 3's hardware display. It runs at double clock speed and has 4-color menus making VIP Writer III FAST and EASY to use! You can choose foreground, background, hilite and cursor colors from up to 64 hues. Color can be turned ON or OFF for the best possible display using a monochrome monitor or TV set. VIP Writer III has a context sensitive help facility to display command usage in easy to read colored windows.

CUSTOMIZER & PRINTER INSTALLER

VIP Writer III comes with a configuration / printer installation program which lets you customize VIP Writer III to suit your own liking. You can set screen width and colors as well as margins and more. You can also install your own printer and set interface type (serial, parallel or J&M), baud rate, line feeds, etc. Once done, you never have to enter these parameters again! VIP Writer III will load n' go with your custom configuration every time!

MORE TOTAL TEXT STORAGE

VIP Writer III has 106K total text storage in a 128K CoCo 3 (495K in 512K). VIP Writer III creates ASCII text files which are compatible with all other VIP Programs as well as other programs which use ASCII files. You can use VIP Writer III to even type BASIC programs! There is a 48K text buffer (438K in a 512K CoCo 3) and disk file linking allowing virtually unlimited text space. VIP Writer III works with up to four disk drives and lets you display directories and free space as well as rename or kill disk files. In addition VIP Writer III is 100% compatible with the RGB Computer Systems Hard Disk.

POWERFUL EDITING FEATURES

VIP Writer III has a full featured screen editor which can be used to edit text with lines up to 240 characters long with or without automatic word wrap around. You can select type-over mode or insert mode. There is even an OOPS command to recall a cleared text buffer. Other editing features include: Type-ahead • typamatic key repeat and key beep for flawless text entry • end of line bell • full four way cursor control with scrolling • top of textfile • bottom of textfile • page up • page down • top of screen • bottom of screen • beginning of line • end of line • left one word • right one word • DELETE character, to beginning or end of line, word to the left or right, or entire line • INSERT character or line • LOCATE and/or CHANGE or DELETE single or multiple occurrence using wildcards • BLOCK copy, move or delete with up to TEN simultaneous block manipulations • TAB key and programmable tab stops • word count • line restore • three PROGRAMMABLE FUNCTIONS to perform tasks such as auto column creation and multiple copy printing.

Writer III or Library /W owners: Upgrade to the VIP Writer III 2.0 for $10 + $3 S/H. Send ORIGINAL disk and $13 total.

Rated "BEST" in RAINBOW Sept. 1988

AUTOMATIC TEXT FORMATTING

VIP Writer III automatically formats your text for you or allows you to format your text in any way you wish. You can change the top, bottom, left or right margin and page length. You can set your text flush left, center or flush right. You can turn right hand justification on or off. You can have headers, footers, page numbers and TWO auxiliary lines which can appear on odd, even or all pages. You can also select the line on which they appear! You can even change the line spacing! Parameters can be altered ANYWHERE !

PREVIEW PRINT FORMAT WINDOW

VIP Writer III features an exclusive format window which allows you to preview your document BEFORE PRINTING IT! You are able to move up, down, left and right to see centered and justified text, margins, page breaks, broken paragraphs, orphan lines etc.

PRINTING VERSATILITY

VIP Writer III prints TWICE as fast as any other CoCo word processor! It supports most serial or parallel printers using J&M JFD-CP or Rainbow interface and gives you the ability to select baud rates from 110 to 19,200. You can imbed printer control codes anywhere in your text file EVEN WITHIN JUSTIFIED TEXT! VIP Writer III also has TWENTY programmable printer macros which allow you to easily control all of your printers capabilities such as bold, underline, italics and superscript using simple key strokes. Other features include: multiple copy printing • single sheet pause • line feeds.

BUILT IN PRINT SPOOLING

VIP Writer III has a print spooler with a 57,000 character buffer which allows you to print one document WHILE you are editing another. You don't have to wait until your printer is done before starting another job! Some word processors DO NOT include this feature!

50,000 WORD SPELLING CHECKER

VIP Writer III includes VIP Speller (not FREEWARE) to check your text for misspelled words It has a 50,000 (not 20,000) word dictionary that can be added to or edited.

QUALITY DOCUMENTATION

VIP Writer III comes with a well written 125 page manual which is Laser printed, not dot-matrix like the competition. It includes a tutorial, glossary of terms and examples for the beginner as well as a complete index! VIP Writer III is truly the BEST you can buy.

VIP Writer III includes VIP Speller 1.1. **DISK $79.95**

VIP Writer owners: Upgrade to the Writer III 2.0 for $49.95 + $3 S/H. Send original disk and $52.95 total.

VIP Database III ✻Cat. #90-915

VIP Database III features selectable screen displays of 40, 64 or 80 characters by 24 lines with choice of 64 foreground, background, hilite and cursor colors for EASY DATA ENTRY. It uses the CoCo 3's hardware screen and double clock speed to be the FASTEST database available! VIP Database III will handle as many records as will fit on your disks and is structured in a simple and easy to understand menu system with full prompting for easy operation. Your data is stored in records of your own design. All files are fully indexed for speed and efficiency. IN-MEMORY SORT of records is LIGHTNING FAST and provides for easy listing of names, figures, addresses, etc., in ascending or descending alphabetical or numeric order. Records can be searched for specific entries using multiple search criteria. The built-in mail-merge lets you sort and print mailing lists, print form letters, address envelopes - the list is endless. The built-in MATH PACKAGE even performs arithmetic operations and updates other fields. VIP Database III also has a print spooler and report generator which uses print forms you create. **DISK $69.95**

VIP Database owners: Upgrade to the VIP Database III for $39.95 + $3 S/H. Send ORIGINAL disk and $42.95 total.

VIP Library /WDCE $179.95

The VIP Library /WDCE (Writer Database Calc Enhanced) combines all six popular VIP application programs - VIP Writer III, Database III, Calc III, Speller, Terminal and Disk-ZAP - into one program on one disk called VIP Desktop. For VIP Library shipping please add $4 USA. $5 Canada. $10 Foreign.

VIP Library owners: Upgrade to the VIP Library /WDCE for $99.95 + $3 S/H. Send ORIGINAL disk and $102.95 total.

VIP Library /WDE owners: Upgrade to the VIP Library /WDCE for $10 + $3 S/H. Send ORIGINAL disk and $13 total.

SD Enterprises info line (805) 566-1317
P O Box 621 Carpinteria, Ca. 93013

Non VIP Library orders add $3 for shipping and handling in USA. Canada $4. Foreign $6. COD orders add an additional $2.75. Checks allow 3 weeks for delivery. California residents add 6% sales tax.

VIP Calc III ✻Cat. #90-916

FAST 4-color POPUP menus • PRINT SPOOLER 32, 40, 64 and 80 Column HARDWARE display! Runs VERY VERY FAST at double clock speed!

Now every CoCo 3 owner has access to a calculating and planning tool better than VisiCalc™, containing all its features and commands and then some. VIP Calc III allows a large worksheet with up to 512 columns by 1024 rows! In addition, VIP Calc III has up to 16 windows which allow you to compare and contrast results of changes. Other features include 8 AND 16 digit precision • trig. functions • averaging • algebraic functions • column and row ascending and descending SORTS • locate formulas or titles in cells • block move and replicate • global or local column width • limitless programmable functions • create BAR charts. Embed printer control codes for customized printing. Combine spreadsheet data with VIP Writer documents to create ledgers, projections, statistical & financial budgets and reports. **DISK $69.95**

VIP Calc owners: Upgrade to the VIP Calc III for $29.95 + $3 S/H. Send original disk and $32.95 total.

Buy RGB-DOS for $29.95,

*Get Hard Disk support, new commands and a Disk Drive FREE!**

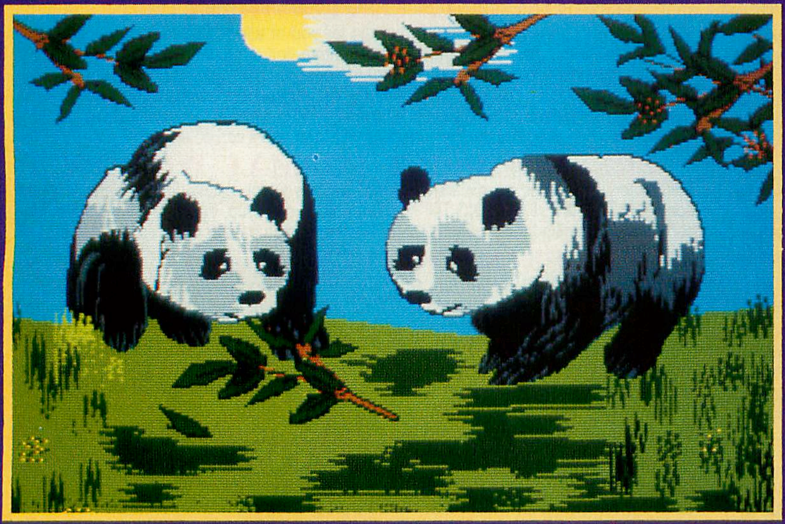
Sounds too good to be true? If you own a Radio Shack FD 502 or other double sided Disk Drive, using RGB-DOS, you can access the other side of your Disk Drive giving a second disk drive absolutely free!* RGB-DOS also supports up to 2 Hard Drives that can be used by DISK BASIC as well as OS-9. RGB-DOS works with CoCo 1, 2 and 3 and supports double sided drives and faster stepping rates. Other features include: Full screen directory display shows drive #, free space and even a disk name! • RUNM command and FLEXIKEY Last Command Recall and Edit system • EPROM version executes any program when CoCo is turned on for hands free start-up. 64K Req'd.

SD Enterprises credit card / COD order line.

1-800-322-9873 EXT 3

✻ Available through your nearby Radio Shack Computer Center® and participating Radio Shack stores and dealers or order direct from Express Order℠ by dialing 1-800-321-3133.

CoCo Gallery



1st Prize

Pandas

Howard C. Rouse

Last year pandas on loan from China were displayed at Busch Gardens. Howard captured the moment with *CoCo Max III*.

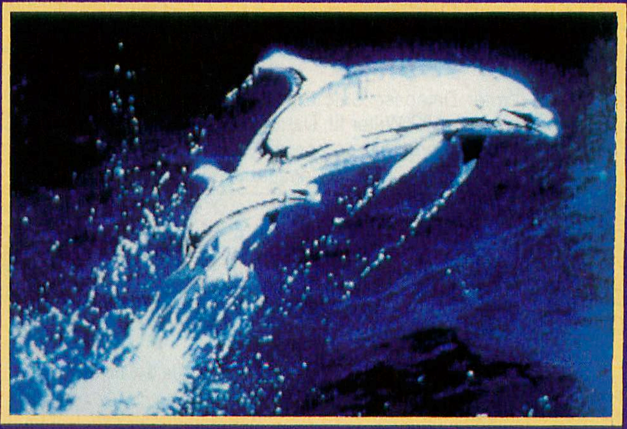
SHOWCASE YOUR BEST!
You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will forward two first prizes of $25, one for the CoCo 3 and one for the CoCo 1 and 2; one second prize of $15 and one third prize of $10. Honorable Mentions may also be given.

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.

—Tony Olive, Curator

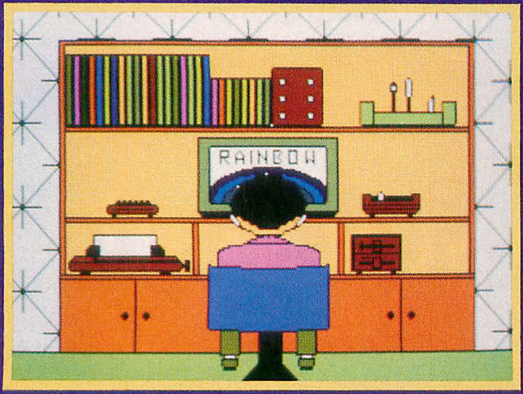


2nd Prize

Dolphin

Marc Vaillancourt

A secondary student living in Ste-Foy, Quebec, Marc enjoys visiting the many BBSs in his area. The scene is designed with *Color Max III*.

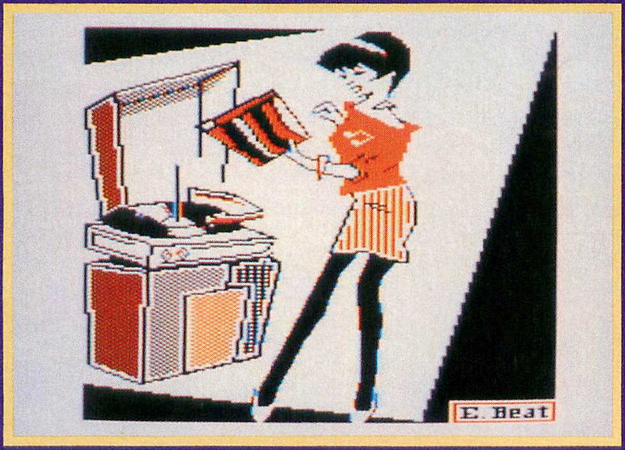


3rd Prize

My Room

Yvan Langlois

This view of Yvan's workstation was created from a BASIC program, which he wrote. From Laval, Quebec, Yvan likes to learn about hardware and OS-9 projects for his CoCo 1 and 2.



1st Prize, Coco 1 or 2

English Beat

George Kowalski

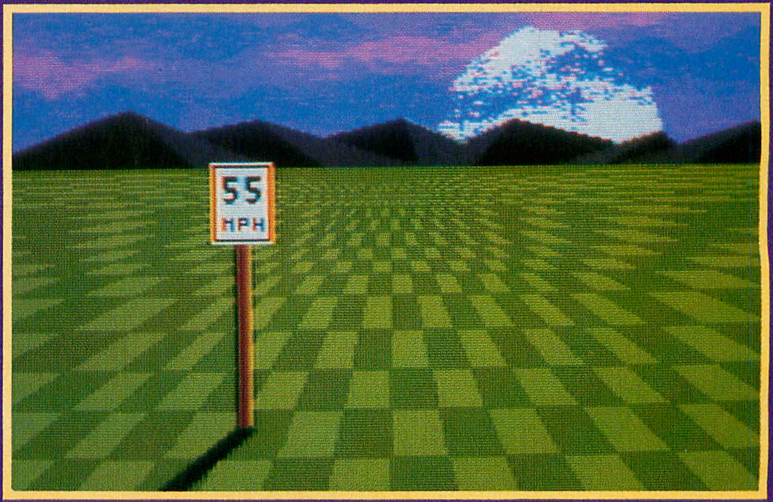
An electrical engineering student at Marquette University, George found some spare time to generate this image using *Graphicom*. He resides in Milwaukee, Wisconsin.

Honorable Mention

Ad Infinitum

Keith Schuler

A depiction of the shadowy realm between reality and fantasy. Of Merritt Island, Florida, Keith designed this BASIC program. His hobbies are swimming, drawing, model car racing and reading.



The answer lies not in the cards,
but on the screen

The CoCo Crystal Ball

By Paul D. Burnham

Many of us have an interest in or, at least, a fascination with astrology, the zodiac, fortune telling, etc. So why not bring these ancient arts and sciences to modern times with the use of your CoCo?

Paul D. Burnham is Computer Operations manager for Miami County, Ohio. He is also a magician and a member of the Society of American Magicians. His other interests include computer programming, art, audio-video, music and sports.

You can with *The Fortune Teller*. Whether you have just a slight interest in your daily horoscope, or you are really into astrology and fortune telling, you'll get a kick out of this program.

Don't worry if you do not have a disk drive — all the information is contained in the program itself. I designed it that way, so all you need is a CoCo with a minimum of 64K, and you're ready to roll.

After running the program and the appearance of the title screen, *The Fortune Teller* asks you a few questions such as the day's date, your birthdate, your name, etc. Answer these questions and you're off and running.

The Fortune Teller describes your good points, bad points, type of career and mates best suited for you, lucky days, best colors and good fortune numbers. It uses information based on your zodiac sign and even more detailed information based on the list of deacons and your ruling planets.

After reading all of this information, the program asks if you have any questions. Yes, the *Fortune Teller* can answer yes or

Telewriter-128™

the Color Computer 3 Word Processor

TELEWRITER: UNDISPUTED #1

If you've read the other word processor ads, you've probably had your fill of cold lists of features, and claims of ultimate speed, power, and ease of use. So let's try to get past the overblown claims and empty buzz words—with 2 simple facts:

Fact 1: Telewriter is undisputedly the #1 most popular word processor on the Tandy Color Computers.

Fact 2: Telewriter's exemplary ease of use and power have been acclaimed in numerous magazine reviews and in thousands of letters and calls from end users.

THE OTHERS DON'T UNDERSTAND

So why has Telewriter gained such a large and loyal following, while other Color Computer word processors have come and gone? Ironically, our competitors' ads tell you *exactly* why.

For them, word processing is nothing more than features and numbers. The longer the list of features, and the bigger the numbers, the better the word processor. Or so they think.

They just don't understand that power and ease of use are not gained by tacking on random features or throwing in freebie utilities or forcing you to use a cumbersome mouse.

Real Power, *true* Ease of Use, and *genuine* Speed can only be attained through thoughtful, logical, intelligent design, attention to detail, and a commitment to the act and the art of writing. That's the Telewriter tradition, and that's the reason for Telewriter's phenomenal success.

TELEWRITER—128: INTELLIGENT DESIGN PERFECTED

And now, Telewriter-128, the latest Telewriter, uses the added hardware power of the Color Computer 3 to bring this intelligent design to its logical perfection.

Telewriter-128 adds unsurpassed speed and important new features to the already impressive arsenal of Telewriter-64. Not just speed for speed's sake, or features for the sake of advertising—but speed where it counts and features that make you a more efficient, more effective writer.

Rainbow magazine put it this way: "Telewriter-128 will set the word processing standard for the Color Computer 3 because it is so simple and user friendly. . . . The 81-page tutorial/user's manual is nicely done. It is written in easy to understand language but the program itself is so easy. . . . Most people will be able to use the software right out of the package."

TELEWRITER-128 OR DESKTOP PUBLISHING

Desktop publishing is nice for adding pictures and fancy fonts to newsletters or business presentations—but its graphics orientation sacrifices some important capabilities when it comes to working with words.

If your main concern is expressing ideas through words (notes, letters, reports, papers, novels, etc.), the dedicated word processing power of Telewriter-128 still provides the most efficient tool for the job. Each tool has its place—desktop publishing for striking visuals, Telewriter-128, for effective writing.

TELEWRITER-128 OR TELEWRITER-64

You can no longer afford to be without the ease, power, and efficiency, that Telewriter brings to everything you write.

Telewriter-128 for the Color Computer 3 costs $79.95 on disk, $69.95 on cassette.

For the Color Computer 1&2, **Telewriter-64** costs $59.95 on disk, $49.95 on cassette.

To order by MasterCard or Visa,
call **(619) 755-1258** anytime, or send check to:

COGNITEC
704 Nob Avenue
Del Mar, CA 92014

(Add $2 S&H. Californians add 6% tax. To upgrade from TW-64 to TW-128 send original TW-64 disk and $41.95.)

Telewriter is also available through your nearby Radio Shack Computer Center and participating Radio Shack stores and dealers—or order direct from Express Order by dialing **1-800-321-3133.**

Ask for: **Telewriter-128** (disk) . . . cat #90-0909
Telewriter-64 (disk) . . . . cat #90-0254
Telewriter-64 (cass) . . . . cat #90-0253

FEATURES THAT MATTER: Telewriter's outstanding design and its complete set of features, put it in a class by itself, for smooth, efficient writing and letter perfect printed documents. Telewriter-128 includes:

Unbeatable SCREEN PERFORMANCE: lightning fast paging and scrolling, on-screen text that never lags behind your typing, and a response that is always instantaneous, no matter how much text is in the buffer, or where you are in the document.

26 User definable MACRO KEYS type your often used phrases and titles with a single keypress—saving you time and freeing your concentration for writing. User settable DUAL SPEED CURSOR moves you anywhere on the line, on the page, or in the document, fast or slow—you decide, with the touch of a finger. Fast PRINT PREVIEW MODE shows you text as it will print: headers, footers, margins, page breaks, page numbers, justification—saves time and paper and guarantees perfect looking documents everytime.

Instant, ON-LINE HELP summarizes all Telewriter-128 commands and special symbols. The On-line OPTIONS MENU lets you instantly customize the writing environment at any time to suit your precise needs (Screen/character color, Monochrome on/off, Key repeat/delay rate, 2 Cursor repeat/delay rates, Case-sensitivity of search, Auto file backup on/off, and more). A SINGLE FUNCTION KEY takes you instantly to any menu, so you never have to stop and think.

The 24, 25 or 28 LINE SCREEN DISPLAY option lets you see 16% more on-screen text (28), or wider line spacing (25). The auto-loading OPTIONS FILE stores all your Macros, Print Format settings, and Options Menu settings, so they are always there everytime you run Telewriter-128. 3 pop-up STATUS WINDOWS tell you cursor position, word count, free space, etc.

The QUICK SAVE feature lets you instantly save your current document with just 2 keystrokes and without leaving the editor. CURSOR THROUGH DIRECTORY to Load, Append, Rename and Kill files—so you'll never type a filename after the first time. HANGING INDENTS help you organize ideas on the page more effectively. Also: Footers, Multiple Print, Print to Disk, Key Click, Key Repeat, 40/80 Column Option, Overstrike, Word Delete, Nested Macros, Definable Foreign and Math Symbols and more. . . .

And, of course, Telewriter-128 incorporates all the Features of TELEWRITER-64, like: Works with *absolutely any printer* that works with your Color Computer (1, 2, or 3). Uses simple Embedded Control Codes so *all* intelligent features of your printer are easily accessed, including: Underlining, Boldface, variable Fonts, Sub-script, Super-script, Italics etc.

Format commands allow dynamically changing Margins, Headers, Spacing, Centering, etc., anywhere in the document. Format menu sets Margins, Spacing, Page numbering, Baud rate, Lines per page, Justification. Chain Printing means the size of your printed document is unlimited. Also Single page and Partial Print.

Fast full-screen editor with wordwrap, text alignment, block copy/move/delete, global search and replace, wild card search, fast 4-way auto-repeat cursor, fast scrolling, forward and backward paging, settable tabs, word and line counter, full error protection. Insert or delete anywhere on screen. Simple, easy to remember, "mnemonic" Editor Commands. Load, Save, Append, Partial Save files to disk or cassette. Kill, rename and list disk files. ASCII file compatibility.

no questions, and they are not random yes or no answers. Better yet, it uses the Pyramid Method, used for years by many fortune tellers. As with most of their answers, the meanings are not obvious at first. Instead, you have to find the hidden meaning in each answer, which adds to the mystery and fun of the program.

Give the *Fortune Teller* a try, maybe to spice up your next party.

(Questions or comments concerning this program may be directed to the author at 648 West Greene St., Piqua, OH 45356. Please include an SASE when requesting a reply.)

120	238	4001	64	4504	81
260	38	4006	56	4509	194
400	182	4013	172	4514	167
410	95	4021	38	4518	196
760	138	4027	112	4523	103
970	4	4036	246	4528	12
3006	140	4042	83	4533	117
3501	128	4051	197	5000	23
3506	189	4057	237	END	45

The Listing: FORTUNE

```
0 'COPYRIGHT 1989  FALOSFT,INC
1 '**************************
2 '*                        *
3 '*     FORTUNE TELLER     *
4 '*  COPYRIGHT (C) 1989    *
5 '*          BY            *
6 '*     PAUL D. BURNHAM    *
7 '*                        *
8 '**************************
9 DIMW$(15)
10 CLS:PRINT"   ****************
*********"
20 PRINT"   *
    *"
30 PRINT"   *    FORTUNE TELLER
    *"
40 PRINT"   *  COPYRIGHT (C) 198
9   *"
50 PRINT"   *        BY
    *"
60 PRINT"   *    PAUL D. BURNHAM
    *"
70 PRINT"   *
    *"
80 PRINT"   ********************
*****"
90 FORD=1TO2000:NEXTD
100 '*** INFORMATION ROUTINE
110 CLS:PRINT"PLEASE ENTER REQUE
STED          INFORMATION..."
120 PRINT:PRINT"TODAY'S DATE (MM
/DD/YY)?"
125 LINEINPUTDA$
126 IFLEN(DA$)<>8THENPRINT"INCOR
RECT FORMAT...TRY AGAIN.":GOTO12
0
130 PRINT:PRINT"YOUR BIRTHDATE (
MM/DD/YY)?"
135 LINEINPUTDT$
136 IFLEN(DT$)<>8THENPRINT"INCOR
RECT FORMAT...TRY AGAIN.":GOTO13
0
140 PRINT:PRINT"YOUR NAME?"
145 LINEINPUTNA$
160 CLS:PRINT:PRINT:PRINT:PRINT"
ONE MOMENT..."
170 PRINT@452,"...YOUR FORTUNE'S
 COMING UP."
200 '*** AGE ROUTINE
210 TM$=MID$(DA$,1,2):TD$=MID$(D
A$,4,2):TY$=MID$(DA$,7,2)
220 BM$=MID$(DT$,1,2):BD$=MID$(D
T$,4,2):BY$=MID$(DT$,7,2)
230 TM=VAL(TM$):TD=VAL(TD$):TY=V
AL(TY$)
240 BM=VAL(BM$):BD=VAL(BD$):BY=V
AL(BY$)
250 IF TM>BM THEN 300
260 IF TM=BM THEN 280
270 TY=TY-1:GOTO300
280 IF TD>=BD THEN 300
290 TY=TY-1
300 YO=TY-BY
350 '*** ZODIAC ROUTINE
351 IFBM=3ANDBD>=21ORBM=4ANDBD<=
20THENZO=1:GOTO400
352 IFBM=4ANDBD>=21ORBM=5ANDBD<=
20THENZO=2:GOTO400
353 IFBM=5ANDBD>=21ORBM=6ANDBD<=
21THENZO=3:GOTO400
354 IFBM=6ANDBD>=22ORBM=7ANDBD<=
21THENZO=4:GOTO400
355 IFBM=7ANDBD>=22ORBM=8ANDBD<=
22THENZO=5:GOTO400
356 IFBM=8ANDBD>=23ORBM=9ANDBD<=
22THENZO=6:GOTO400
357 IFBM=9ANDBD>=23ORBM=10ANDBD<
=22THENZO=7:GOTO400
358 IFBM=10ANDBD>=23ORBM=11ANDBD
<=23THENZO=8:GOTO400
359 IFBM=11ANDBD>=24ORBM=12ANDBD
<=21THENZO=9:GOTO400
360 IFBM=12ANDBD>=22ORBM=1ANDBD<
=19THENZO=10:GOTO400
361 IFBM=1ANDBD>=20ORBM=2ANDBD<=
19THENZO=11:GOTO400
362 IFBM=2ANDBD>=20ORBM=3ANDBD<=
20THENZO=12:GOTO400
400 '*** DECAN ROUTINE
401 IFZO=1THENIFBD>=21ANDBD<=29T
HENDE=1ELSEIFBD>=11ANDBD<=20THEN
DE=3ELSEDE=2
402 IFZO=2THENIFBD>=21ANDBD<=29T
HENDE=1ELSEIFBD>=11ANDBD<=20THEN
DE=3ELSEDE=2
403 IFZO=3THENIFBD>=21ANDBD<=30T
HENDE=1ELSEIFBD>=11ANDBD<=21THEN
DE=3ELSEDE=2
404 IFZO=4THENIFBD>=2ANDBD<=10TH
ENDE=2ELSEIFBD>=11ANDBD<=21THEND
```

NEW

BEST PUBLIC DOMAIN PROGRAMS !

NEW

FROM T&D SUBSCRIPTION SOFTWARE

T&D SUBSCRIPTION SOFTWARE HAS ACCUMULATED OVER 1.000 PUBLIC DOMAIN PROGRAMS FOR THE COLOR COMPUTER.

WE ARE SELLING 630 OF THE BEST. JUST THE GOOD STUFF !

Music 1-7

M1 - 8 Utilities & 8 Songs
M2 - 17 Musica Files
M3 - 16 Musica Files
M4 - 16 Musica Files
M5 - 25 Orchestra Files
M6 - 23 .Bin Files Ready To Run
M7 - 23 .Bin Files Ready To Run

ADVENTURES 1,2

Each Disk/Tape Contains
9 Great Adventures
Ready To Run

Order A1 Or A2

TELECOMMUNICATIONS 1-3

T1 - Haysae, Kermit, Mterm
T2 - Cobster Terminal Package
T3 - Mikeyter Terminal Package

RAINBOW
CERTIFICATION
SEAL

GRAPHICS 1-4

G1 - 12 Basic Graphic Programs
G2 - 12 Basic Graphic Programs
G3 - 9 Coco 3 Graphic Programs
G4 - 22 Coco Max Pictures
G5 - 22 Coco Max Pictures
G6 - 22 Coco Max Pictures
G7 - 15 Coco Max Pictures
G8 - 22 .Bin Pictures
G9 - 22 .Bin Pictures
G10 - 14 Large .Bin Pictures
G11 - 8 Mge Pictures
G12 - Coco Max 3 Pictures
G13 - Macpaint Graphic Editor
G14 - 5 Macintosh Pictures

EDUCATION 1-4

E1 - 12 Programs For Young Kids
E2 - 12 Programs For High School Kids
E3 - 11 Programs Teaching The Coco'S Commands
E4 - 5 Graphics Programs About Australia

HOME MANAGEMENT 1-4

• 12 Programs Each Disk/Tape •

H1 - Checkbook, Database, Word Processor, +
H2 - Cash Journal, Investments, Mail List, +
H3 - Finance, Int. Rates, Stocks, +
H4 - Spelling Fix, Spelling Checker, +

GAMES 1-11

• Each Disk/Tape Contains 12 Programs •

GA1 - 3Dtictac, Missle, Poker, Tycoon, +
GA2 - Chess, Motojump, Rider, Slots, +
GA3 - Battship, Golf, Lander, Robots, +
GA4 - Abm, Cartel, Subchase, Trek, +
GA5 - Blackjack, Laser, Raceway, Utopian, +
GA6 - Kings, Navyguns, Poolgame, Subship, +
GA7 - Connect4, F-16, Life, Mazeland, +
GA8 - Chute, Football, Othello, Slither, +
GA9 - Civilwar, Flight, Prix, Stock, +
GA10 - Cave, Fly, Pedro, Scramble, +
GA11 - Bunkers, Craps, Gunner, Nukeattk, +

UTILITIES 1-8

• 12 Programs Each, 1-4 Require Disk •

U1 - Backup35, Diskzapr, Romcopy, Timer, +
U2 - Customize, Diskfix, Disktest, Multback, +
U3 - Diskaid, Dsklibry, Mldata, Playmac, +
U4 - Macpix, Stat-Log, Unarc, Unmaster, +
U5 - Assemblr, Mcbase, Squeezw, Writer, +
U6 - Chr-Ed3, Hgrcolor, Minidos, Updnlist, +
U7 - Head Print With 30 Mini Pictures
U8 - Fig Forth Language With Tutiorial

BUY ALL 53 DISKS/TAPES FOR ONLY $145.00 !

MAIL TO:
T&D Subscription Software
2490 Miles Standish Drive
Holland, Michigan 49424
(616) 399-9648

Call or write for a FREE catalog !

PRICES:
1 disk/tape............$5.00 each
6 or more..............$4.00 each
All 53 disks/tapes $145.00

MasterCard VISA

• WE SEND 1ST CLASS - NO CHARGE •

• PERSONAL CHECKS WELCOME •

Name______________________________

Address______________________________

City________________ State_____ Zip__________

Credit Card #______________________________

Expires______________________________

TOTAL AMOUNT $______________________________

CIRCLE ISSUES DESIRED

M1 M2 M3 M4 M5 M6 M7
A1 A2
T1 T2 T3
G1 G2 G3 G4 G5 G6 G7 G8 G9 G10 G11 G12 G13 G14
E1 E2 E3 E4
H1 H2 H3 H4
U1 U2 U3 U4 U5 U6 U7 U8
GA1 GA2 GA3 GA4 GA5 GA6 GA7 GA8 GA9 GA10 GA11

PLEASE CIRCLE
TAPE DISK

Please turn to pages 106 and 107 for our Subscription Software!

```
E=3ELSEDE=1
405 IFZO=5THENIFBD>=2ANDBD<=12TH
ENDE=2ELSEIFBD>=13ANDBD<=22THEND
E=3ELSEDE=1
406 IFZO=6THENIFBD>=2ANDBD<=11TH
ENDE=2ELSEIFBD>=12ANDBD<=22THEND
E=3ELSEDE=1
407 IFZO=7THENIFBD>=2ANDBD<=12TH
ENDE=2ELSEIFBD>=13ANDBD<=22THEND
E=3ELSEDE=1
408 IFZO=8THENIFBD>=3ANDBD<=14TH
ENDE=2ELSEIFBD>=15ANDBD<=23THEND
E=3ELSEDE=1
409 IFZO=9THENIFBD>=24ANDBD<=30T
HENDE=1ELSEIFBD>=1ANDBD<=11THEND
E=2ELSEDE=3
410 IFZO=10THENIFBD>=22ANDBD<=30
THENDE=1ELSEIFBD>=11ANDBD<=19THE
NDE=3ELSEDE=2
411 IFZO=11THENIFBD>=20ANDBD<=31
THENDE=1ELSEIFBD>=1ANDBD<=10THEN
DE=2ELSEDE=3
412 IFZO=12THENIFBD>=2ANDBD<=10T
HENDE=2ELSEIFBD>=11ANDBD<=20THEN
DE=3ELSEDE=1
600 '*** PRINT ROUTINE
610 CLS:PRINT"F O R T U N E"
620 PRINT:PRINT"THIS FORTUNE IS
FOR                  ";NA$;"."
630 PRINT"YOU ARE ";YO;" YEARS O
LD."
640 PRINT"YOUR BIRTHDATE IS ";DT
$;"."
650 GOSUB4000
660 GOSUB4500
700 '*** QUESTION ROUTINE
705 CLS
710 INPUT"DO YOU HAVE A QUESTION
 FOR THE  FORTUNE TELLER";YN$
720 IFYN$="N"ORYN$="NO"THEN5000
730 CLS:PRINT"PLEASE ASK A YES O
R NO QUESTION THAT IS LESS THAN
TEN WORDS IN  LENGTH.  AT THE EN
D OF THE  QUESTION, PRESS sp
ace bar ONCE  AND THEN PRESS ent
er.""
740 PRINT
750 C=0:P=0:P1=0
760 INPUTQS$
770 C=C+1:P1=P+1
771 QL=LEN(QS$)
772 IFMID$(QS$,QL,1)<>" "THENPRI
NT"YOU FORGOT THE SPACE AT THE E
ND OF THE QUESTION...ASK AGAIN."
:GOTO750
773 P=INSTR(P1,QS$," ")
775 W$(C)=MID$(QS$,P1,P-P1)
780 IF P=QL THEN 810
790 GOTO770
810 IFC<3THENPRINT"QUESTION TOO
SHORT...TRY AGAIN.":GOTO750
820 IFC>9THENPRINT"QUESTION TOO
LONG... TRY AGAIN.":GOTO750
825 PRINT
830 FORI=1TOC
840 L=LEN(W$(I))
850 FORJ=1TOL
860 Q$=MID$(W$(I),J,1)
870 GOSUB3000
880 W(I)=W(I)+Q
890 NEXTJ
900 IFW(I)<10THEN940
910 X=W(I)
920 GOSUB1500
930 W(I)=X
940 NEXTI
950 '*** PYRAMID ROUTINE
960 C=C-1
970 FORI=1TOC
980 T(I)=W(I)+W(I+1)
990 IFT(I)<10THEN1030
1000 X=T(I)
1010 GOSUB1500
1020 T(I)=X
1030 NEXTI
1040 FORI=1TOC
1050 W(I)=T(I)
1060 NEXTI
1070 IFC>1THEN960
1080 GOTO3500
1500 '*** REDUCING ROUTINE
1510 X$=STR$(X)
1520 L1=LEN(X$)
1530 Y=0
1540 FORK=1TOL1
1550 Y$=MID$(X$,K,1)
1560 Y1=VAL(Y$)
1570 Y=Y+Y1
1580 NEXTK
1590 X=Y
1600 IFX<10THEN1620
1610 GOTO1510
1620 RETURN
3000 '*** PYRAMID DATA
3001 IFQ$="A"THENQ=1
3002 IFQ$="B"THENQ=5
3003 IFQ$="C"THENQ=6
3004 IFQ$="D"THENQ=4
3005 IFQ$="E"THENQ=2
3006 IFQ$="F"THENQ=8
3007 IFQ$="G"THENQ=8
3008 IFQ$="H"THENQ=3
3009 IFQ$="I"THENQ=7
3010 IFQ$="J"THENQ=6
3011 IFQ$="K"THENQ=6
3012 IFQ$="L"THENQ=5
3013 IFQ$="M"THENQ=7
3014 IFQ$="N"THENQ=5
3015 IFQ$="O"THENQ=8
3016 IFQ$="P"THENQ=5
3017 IFQ$="Q"THENQ=6
3018 IFQ$="R"THENQ=9
```

Frank Hogg Laboratory

Over 12 Years of Service, Support, and Friendly Help!

SPRING SALE

BOOKS

START OS/9

An Enjoyable, Hands-On Guide
To OS-9 Level II
$32.95 Book and Disk

If you have OS-9 Level 2 or are thinking of getting it, this book and disk will get you started in an enjoyable way. It makes OS-9 fun. The disk contains utilities and tutorials that are worth the price alone. Now there is a reason to get OS-9

Inside OS9 Level II

SPECIAL ONLY 19.95!

Are your tired of playing games with Level II? Do you want to find out what's going on inside OS9? This is the book for you! Over 200 pages of hints, kinks, bugs, source listings and much more. Written by the well known Compuserve SysOp, Kevin Darling. 'Must reading' says Dale Puckett in Rainbow!

DynaStar

THE Most Popular OS-9 Word Processor!

"It is an excellent word processor for business and home use, whether for clerical or programming work." RAINBOW Review April 1989, Page 34. Also see July 1984, Page 220.

FEATURES: Best OS9 editor/word processor/text formatter, has everything you would expect and more, supports terminals and windows simultaneously, auto-configurable, auto-indent for C and Pascal, **mail merge** for form letters.

Pop-up help menus that can be disabled. WordStar command style. Files larger than memory. Block manipulation, mark, move, copy, delete, read from disk, write to disk. Keyboard Macros, (up to 29) to produce any key sequences, including commands!

Supports multiple printers. Formatting Commands: Justification, word wrap, centering, headers, footers, macros, odd and even support, multiple index generation, multiple table of contents generation and more!

DynaStar word processor/formatter ~~150.00~~

SPECIAL ONLY 99.95

DynaSpell

by Dale Puckett

20,000+ word dictionary included. Fast, slick, the best spelling checker available for OS9. Written by RainbowTech columnist Dale Puckett.

DynaSpell spelling checker 75.00

SPECIAL WHEN PURCHASED WITH DynaStar 25.00

The Wiz

The WIZ ~~79.95~~ **Super SPECIAL ONLY 59.95**
Includes ShareWare ***WizPro*** Disk FREE!

RS-232 Pak	49.95
2400 Baud Modem (5 Year Warranty)	199.95

Hard Drive Systems

*"Frank Hogg Laboratories has been selling hard-drive systems **longer** than any other RAINBOW advertiser"*

Burke and Burke

Burke & Burke based kit includes: Burke & Burke (B&B) XT PC interface. Hard drive with controller, 3 foot ST506 cable set. Hard Drive Case with 60 watt power supply and fan. Includes OS9 LI and LII software. 1 megabyte transfer in only 45 seconds!! Twice as fast as other systemsType ahead under OS9. (No halt) Complete instructions. Easy one evening assembly.

20 Meg Kit Complete	498.00
30 Meg Kit Complete	548.00
40 Meg Kit Complete	618.00
Assemble fmt & test any of the above	50.00
B&B OPTIONS:	
B&B Real Time Clock (add to above)	30.00
B&B XT ROM Auto Boot from hard disk	19.95
B&B Hyper I/O DECB on hard drive	29.95
B&B Hyper III Ramdisk/spooler	19.95

The Eliminator™

The Eliminator™ based kit includes Bruce Isted's new interface ***'The Eliminator'™*** the Western Digital WD 1002-05 high speed controller. **Features**; fastest system available, 1 megabyte transfer in only 37 seconds!! More than twice as fast as other systems! Supports 4 floppy and 3 hard drives, type ahead (No halt) for **both floppy and hard disk, autoboot OS9** L1 or L2 from hard or floppy disk, **2 serial ports, 1 parallel port and Real Time Clock** socket. Hard drive with WD 1002-05 controller, ST506 cable set, 3 foot 40 pin cable, Hard Drive Case with 60 watt power supply and fan, OS9 software for LI and LII with **source**, Complete instructions. Easy one evening assembly.

20 Meg High Speed Kit Complete	799.00
40 Meg High Speed Kit Complete	899.00
70 Meg High Speed Kit Complete	1335.00
Assemble fmt & Test any of the above	60.00
Eliminator OPTIONS:	
Real Time Clock chip	30.00
Serial cable set (2 DB25)	30.00
Parallel cable (Centronics)	30.00
Floppy Cable Int & Ext	25.00

Hard Drive Bits and Pieces

The Eliminator™ Special 179.95	~~199.95~~
See Eliminator OPTIONS also	
WD1002-05 Controller	199.95
B&B XT PC style interface	69.95
B&B XT RTC interface w/clock/calendar	99.95
See B&B OPTIONS also	
Hard Drive case with 60W P/S & Fan	99.95

SPECIFICATIONS: size 16" deep, 5.5" high, 7" wide. 60 Watt power supply with 3 drive type power connectors, quiet 12 volt DC fan, LED power indicator, color matches CoCo. Holds 2 1/2 height hard or floppy drives and has card guided space for a PCB the size of a drive (like the WD1002-05 controller)

FBU Fast Hard disk Back Up	75.00
R.S.B. RS Disk Basic under OS9	39.95

Floppy Drives (5.25" and 3.5 FLOPPY DISKS)
TEAC High Quality Drives - 1 Year Warr.

FD55B 360K 40 Track DS 5.25"	118.00
FD55F 720K 80 Track DS 5.25:	151.00
FD35F 720K 80 Track DS 3.5"	147.00

(Bare drives, requires case and power supply)

Sculptor

Version 1.16
SPECIAL ONLY 199.95
100% Object Code Compatible
100% Data File Compatible

Sculptor, a 4th Generation Language, is an applications generator, a database, and a programming language. With ***Sculptor*** you can develop an application in one tenth the time it would take in Basic.

Now with version 1.16 you can take applications created on your CoCo and run them on PC's, Unix machines etc. (with the proper runtime) ***Sculptor*** is the most powerful program available for the CoCo.

During this special introduction of version 1.16 we have reduced the price to ONLY $199.95!

Existing Sculptor users can update to version 1.16 for 60.00

Requires OS9 Level II and 512K.
Works with floppies or hard disks.

News•a•Log!

Subscribe FREE to our NEW Newsletter/Catalog.

Sculptor Review, QT K-System Review, OS9/68K News, Special Prices on FHL Products
Special Low Prices on Fax Machines, copiers, calculators, and much more.
It's FREE!

ORDERING INFORMATION

VISA and M/C, check and C.O.D. Contential U.S. software shipping add $3.50 Ground - $6.00 Two Day Air. Hardware add $11 ground - $22 Two Day Air. Please call for Next Day Air costs and C.O.D. Foreign add 10% Shipping (Minimum $5 USD). NY residents please add 7% sales tax.

Frank Hogg Laboratory, Inc.

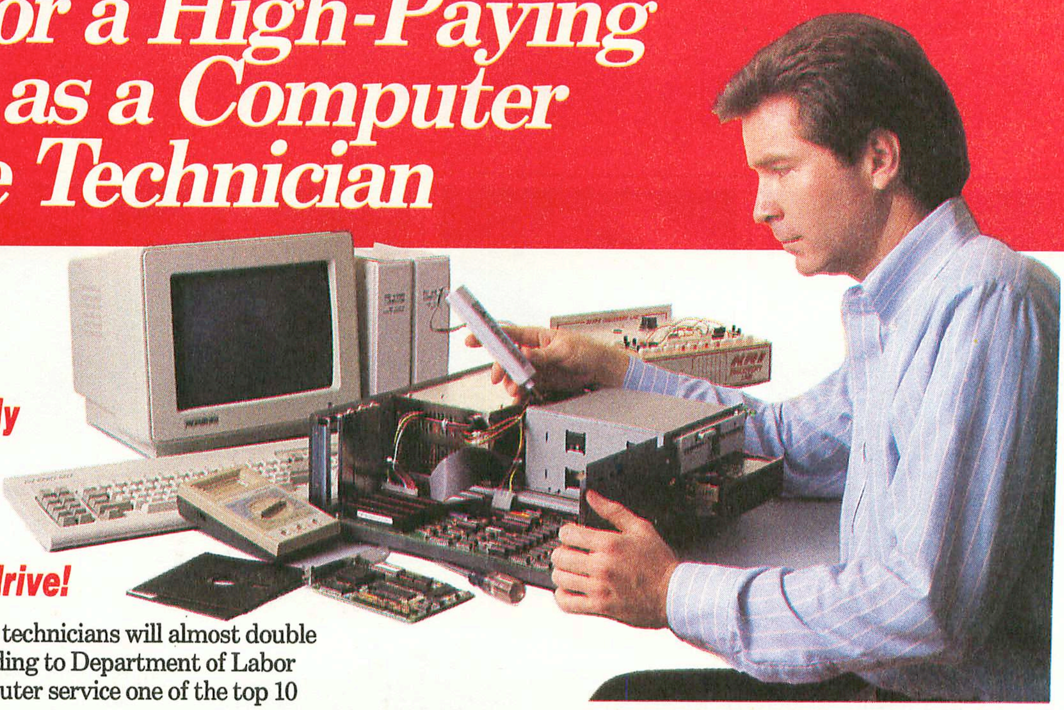
Since 1976
770 James Street
Syracuse, NY 13203

Fax 315/474-8225

Call 315/474-7856

```
3019 IFQ$="S"THENQ=9
3020 IFQ$="T"THENQ=2
3021 IFQ$="U"THENQ=8
3022 IFQ$="V"THENQ=8
3023 IFQ$="W"THENQ=3
3024 IFQ$="X"THENQ=1
3025 IFQ$="Y"THENQ=8
3026 IFQ$="Z"THENQ=6
3030 RETURN
3500 '*** PYRAMID ANSWERS
3501 IFW(1)=1THENPRINT"BE ASSURE
D THAT IN TIME SUCCESS WILL BE Y
OURS AND YOUR HOPES    WILL PROS
PER, IF NOT THROUGH    YOUR OWN
DOING THEN AS THE      RESULT OF
 SOME UNEXPECTED       HAPPENING
S."
3502 IFW(1)=2THENPRINT"THERE WIL
L BE NO SUCCESS IF     HESITATIO
N HAS REPLACED         DETERMINA
TION.  THE OPPOSITE SEXWILL HAVE
 A POWERFUL INFLUENCE  IN BRINGI
NG A NEGATIVE RESULT."
3503 IFW(1)=3THENPRINT"YOU MAY E
XPECT GAINS,           ADVANCEME
NT OR A BROADENING OF  ACTIVITIE
S, BUT YOU MUST HOLD   FAST TO Y
OUR PURPOSE AND NEVER  LET YOURS
ELF BE SWAYED IN DOING WHAT YOU
DESIRE TO DO."
3504 IFW(1)=4THENPRINT"YOU WILL
EXPECT FAR MORE THAN   YOU WILL
RECEIVE, FOR           DISAGREEM
ENT AND QUARRELING WILLRUIN YOUR
 PLANS.  THIS WILL     HAPPEN BE
CAUSE OTHERS WISH TO   TAKE ADVA
NTAGE OF YOU."
3505 IFW(1)=5THENPRINT"THERE IS
THE CHANCE OF MUCH GOODCOMING TO
 YOU DURING A JOURNEY. YOUR QUES
TION MAY BE ANSWERED   AFTER YOU
 HAVE RECEIVED AN      UNEXPECTE
D LETTER OF MUCH       IMPORTANC
E."
3506 IFW(1)=6THENPRINT"YOU MAY E
XPECT ASSISTANCE FROM  SOMEONE O
F THE OPPOSITE SEX.    WHAT YOU
DESIRE IS GOING TO BE  FULFILLED
, AND IN THE END THE   STEPS YOU
 HAVE ALREADY TAKEN    WILL NOT
BE REGRETED."
3507 IFW(1)=7THENPRINT"YOU MAY A
NTICIPATE POSITIVE     RESULTS T
HAT WILL INVOLVE YOU INRELATIONS
 WITH MANY PEOPLE.  IF YOU ARE N
OT INFLUENCED BY THE   ADVICE OF
 ANOTHER, YOU WILL REAPJOY."
3508 IFW(1)=8THENPRINT"THERE ARE
 MANY OBSTACLES AHEAD. YOU COULD
 SUSTAIN A REVERSAL OF FORTUNE.
 ALL SIGNS POINT TO    FAILURE D
O TO THE ILL WILL AND  MALICE OR
 INCOMPETENCY OF       OTHERS."
3509 IFW(1)=9THENPRINT"THERE ARE
 MANY OBSTACLES AHEAD, BUT KEEP
A STOUT HEART AND ALL  WILL BE W
ELL.  THE GREATER YOUR RISKS, TH
E GREATER YOUR ULTIMATEREWARDS.
 SO HAVE COURAGE."
3510 PRINT:PRINT:GOTO710
4000 '*** ZODIAC ANSWERS
4001 IFZO=1THENPRINT"YOU WERE BO
RN UNDER THE SIGN OF ARIES - THE
 RAM.  YOU ARE A     LEADER - CH
OOSE A CAREER WHERE  YOU CAN SHI
NE BY YOURSELF. ":PRINT:LINEINPUT
 "PRESS enter TO CONTINUE...";YN
$
4002 IFZO=1THENCLS:PRINT"YOU WIL
L BE ADMIRED FOR YOUR    SUCCESS
 THRU EXTRAORDINARY      ACHEIVE
MENTS.  LEARN NOT TO TAKEON TOO
MUCH AT ONCE - YOU WORK  TOO HAR
D - RELAX.  YOU WILL FALLIN LOVE
 MANY TIMES THINKING EACH"
4003 IFZO=1THENPRINT"IS THE LOVE
 OF YOUR LIFE - SO   MARRY ONLY
AFTER LONG ENGAGEMENT- NEVER ELO
PE.  YOU ARE POPULAR AND MAKE FR
IENDS EASILY - TO    AVOID SORRO
W FOR YOURSELF -     CONTROL YOU
R TEMPER AND TENDENCYTO BOSS PEO
PLE."
4004 IFZO=1THENPRINT:LINEINPUT"P
RESS enter TO CONTINUE...";YN$
4005 IFZO=2THENPRINT"YOU WERE BO
RN UNDER THE SIGN OF TAURUS - TH
E BULL.  YOU WILL BE HAPPIEST DO
ING SOME SORT OF     CREATIVE WO
RK.":PRINT:LINEINPUT"PRESS enter
 TO CONTINUE...";YN$
4006  IFZO=2THENCLS:PRINT"YOU WI
LL BE SUCCESSFUL IN YOUR  CHOSEN
 CAREER.  YOU MAKE CLOSE  FRIEND
SHIPS EASILY - AND WILL   ENJOY
MANY OF THEM.  OBSTANANCE IS YOU
R WORST FAULT - YOU REFUSETO ACC
EPT CHANGE, THINKING OLD"
4007 IFZO=2THENPRINT"WAY OF DOIN
G IS BETTER WAY OF   DOING.  YOU
 WILL ENJOY VERY GOODHEALTH - DO
 NOT OVEREAT OR DRINKAND GET PLE
NTY OF EXERCISE.":PRINT:LINEINPU
T"PRESS enter TO CONTINUE...";YN
$
4010 IFZO=3THENPRINT"YOU WERE BO
RN UNDER THE SIGN OF GEMINI - TH
E TWINS.  MANY       DIFFERENT C
AREERS APPEAL TO YOU - IF YOU DO
 NOT SUCCEED, IT IS  NOT DO TO L
ACK OF TALENT, BUT   BECAUSE YOU
```

Train for a High-Paying Career as a Computer Service Technician



Only NRI teaches you to service all computers as you build your own fully XT-compatible micro—now with 512K RAM and 20 meg hard drive!

Jobs for computer service technicians will almost double in the next 10 years according to Department of Labor projections, making computer service one of the top 10 growth fields in the nation.

Now you can cash in on this opportunity—either as a full-time industry technician or in a computer service business of your own—once you've mastered electronics and computers the NRI way.

Get inside the powerful, fully XT-compatible Packard Bell computer system

To give you hands-on training with the absolute in state-of-the-art computer technology, NRI includes the powerful new Packard Bell VX88 computer as the centerpiece of your training. You build this 512K, fully IBM PC/XT-compatible computer from the keyboard up, plus you now go on to install a 20 megabyte hard disk drive to complete your total computer system.

Understanding you get only through experience

You need no previous background in electronics to succeed with NRI. You start with the basics, rapidly building on the fundamentals of electronics with bite-size lessons. You perform hands-on experiments with your NRI Discovery Lab® and then move on to master such advanced concepts as digital logic, microprocessors, and computer memories.

Learn at home in your spare time

With NRI, you learn at your own convenience in your own home. No classroom pressures, no night school, no need to quit your present job until you're ready to make your move. And all throughout your training you've got the full support of your personal NRI instructor and the entire NRI technical and support staff. They're always ready to answer your questions and help you whenever you need it.

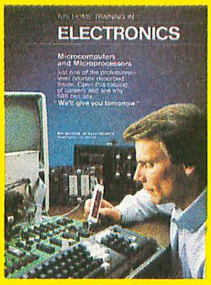
Get all the facts from NRI's free 100-page catalog. Send today!

Your incomparable hands-on training includes all this:

NRI's unique Discovery Lab® lets you design and modify circuits, diagnose and repair faults • Hand-held digital multimeter, complete with "talk-you-through" instructions on audio cassette • Digital logic probe lets you visually examine computer circuits • The latest Packard Bell VX88 computer with "intelligent" keyboard and 5¼" floppy disk drive • 20 megabyte hard disk drive you install internally • 16K ROM, 512K RAM • MS-DOS, GW-BASIC, and exclusive word processing, database, and spreadsheet software • Reference manuals, programming guidelines, and schematics.

See other side for highlights of NRI "hands-on" computer training ➔

SEND CARD TODAY FOR FREE NRI CATALOG



COMPUTERS AND MICROPROCESSORS

This training prepares you to service all computers as you build your own fully IBM PC/XT-compatible computer. Total systems training includes 5¼" floppy disk drive, 20 meg hard disk drive, monitor, test equipment, software, and the NRI Discovery Lab®.

☑ Check one FREE catalog only.

☐ **Computers and Microprocessors**
☐ TV/Video/Audio Servicing
☐ Robotics
☐ Computer Programming
☐ Security Electronics
☐ Electronic Music Technology
☐ Digital Electronics Servicing
☐ Basic Electronics

Name (Please print) Age

Address ( ) Telephone

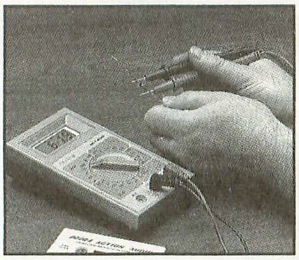
City State Zip

For career courses approved under GI Bill ☐ check for details.

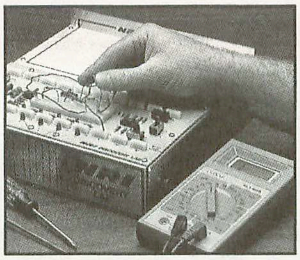
205-069

Accredited Member National Home Study Council

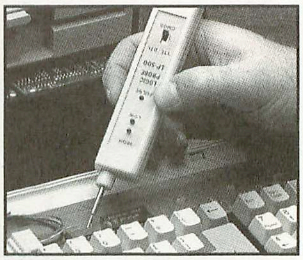
Get In-Demand Computer Servicing Skills With NRI "Hands-On" Training



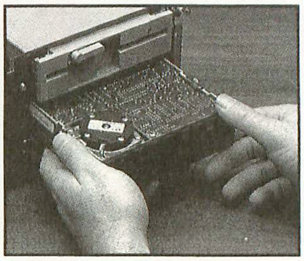
Using NRI's unique Action Audio Cassette, you're talked through the operation and practical applications of your hand-held digital multimeter—the basic, indispensable tool for the computer specialist.



You set up and perform electronics experiments and demonstrations using your NRI Discovery Lab®. You even interface the lab with your computer to "see" keyboard-generated data.



After you build this digital logic probe, you explore the operation of the Packard Bell detached "intelligent" keyboard and its dedicated microprocessor.

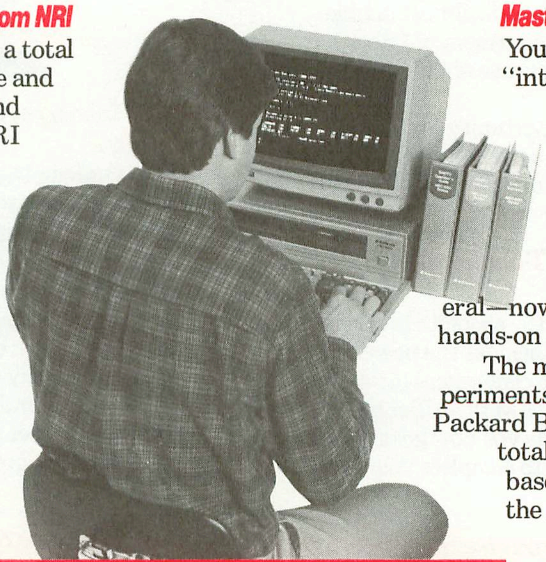


Next, you install the 5¼" floppy disk drive, learning disk drive operation and adjustment. You later improve your data storage capacity dramatically by installing a powerful 20 meg hard drive.

Total Computer Systems Training, Only From NRI

No computer stands alone . . . it's part of a total system. So if you want to learn to service and repair computers, you have to understand today's computer *systems.* And only NRI builds meaningful training around just such a powerful computer system—the new Packard Bell VX88 computer, complete with monitor, floppy disk drive, hard disk drive, and valuable software—all yours to train with and keep.

The VX88 features full IBM PC/XT compatibility, the breakneck speed of an advanced CMOS V40 CPU, and big-system raw power: 512K RAM and full expandability for future system growth.



Mastery Is "Built-In"

You assemble the Packard Bell "intelligent" keyboard, install the power supply and 5¼" floppy disk drive, and attach the high-resolution monitor. You then go on to install a powerful 20 meg hard drive—today's most-wanted computer peripheral—now included as part of your NRI hands-on training.

The many demonstrations and experiments you perform as you build your Packard Bell computer system give you a total mastery of computer operation, based on a thorough knowledge of the intricacies of computer theory.

SEND CARD TODAY FOR FREE NRI CATALOG

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 10008 WASHINGTON, D.C.

POSTAGE WILL BE PAID BY ADDRESSEE

NRI School of Electronics
McGraw-Hill Continuing Education Center
4401 Connecticut Avenue, NW
Washington, DC 20077-3543

100-Page Free Catalog Tells More . . . Send Today!

Send the postage-paid card today for NRI's free 100-page catalog that gives all the facts about NRI computer training, plus career training in robotics, TV/video/audio servicing, electronic music technology, and many other fields. If the card is missing, write to NRI at the address below.

IBM is a registered trademark of International Business Machines Corp.

NRI School of Electronics
McGraw-Hill Continuing Education Center
4401 Connecticut Avenue, NW
Washington, DC 20008

Burke & Burke

Purveyors of fine Color Computer Hardware and Software Since 1987

INTERNATIONAL ORDERS: *206-235-0917*

TOLL-FREE U.S. ORDER HOTLINE: *1-800-ADS-AHOY 1-800-237-2409*

TECHNICAL SUPPORT: *1-206-235-0917*

QuarterMeg

256K for $89.95!

Price includes 4 memory chips at our current reference market price. Due to fluctuating market conditions, prices are subject to change without notice.

A New Breed of CoCo 3 Memory Expansion

Uses existing CoCo 3 64K x 4 memory chips!

Our revolutionary circuit combines four 64K x 4 memory chips on the QuarterMeg board with the four identical memory chips in the 128K CoCo 3 to double your OS9 and BASIC memory to 256K.

QuarterMeg is Burke & Burke's revolutionary new 256K memory upgrade board for the CoCo 3. The QuarterMeg board uses only 4 memory chips to double your CoCo 3's memory to 256K.

Both OS9 and BASIC recognize and use this extra memory automatically! Many 512K programs work superbly with QuarterMeg, but some 512K RS-DOS programs require compatibility patches. We include installation and utility software for both OS9 and BASIC.

In addition, QuarterMeg's RAM disable jumper instantly switches your system between original 128K and fully expanded 256K mode.

Zero-K QuarterMeg (no chips) -- $39.95
Standard QuarterMeg (4 chips) & Fat QuarterMeg (8 chips)
>>> MARKET PRICE <<<

Real BASIC for OS9!

There is nothing wrong with your Color Computer. Do not attempt to adjust it.

Burke & Burke's R.S.B. software gives you a complete, OS9-compatible version of Disk Extended Color BASIC. We've added new software for OS9-style graphics, sound, printer, and disk I/O. The BASIC you know and love is now running under Level 2 OS9 windows!

R.S.B. loads and saves files using OS9's file format, so we've also included utilities to transfer BASIC programs and data files betwen OS9 and BASIC disks. Of course, you can't use R.S.B. to run machine language programs, and some BASIC commands work slightly differently under R.S.B.

Your BASIC programs can take full advantage of great OS9 features like hard disks, no-halt floppies, multi-tasking, and 2 MHz operation.

R.S.B. requires a CoCo 3 with at least 128K RAM (256K strongly recommended), a floppy controller with either Tandy Disk BASIC or DISTO CoCo 3 CDOS, and Level 2 OS9.

R.S.B. Version 1.2
$39.95

CoCo-XT Hard Disk Interfaces

Hundreds of Color Computer enthusiasts in the US, Canada, Europe, South America, and Australia love our affordable high-performance hard disk interfaces!

Each includes a durable, fully enclosed metal housing, 100 page user manual, and software for use with HYPER-I/O or OS9. The CoCo XT-RTC adds a battery-powered real time clock / calendar for OS9 and BASIC.

CoCo XT	$69.95
CoCo XT-RTC	$99.95

Technical Summary:

NO HALT • 1 or 2 hard drives • 30% faster than SASI • Uses PC-type hard disk drives & controllers • 5 Meg to 120 Meg per drive • Does not use interrupts • Multi-PAK recommended • Works with 12 Volt Y-cables • Includes EZGen boot file editor for easy installation

Share your hard disk between BASIC and OS9 with HYPER-I/O (not included)

The Profesional Touch: XT-ROM 2.3

Install XT-ROM in your CoCo XT hard disk controller's BIOS ROM socket. It automatically boots and reboots OS9 from your hard disk.

XT-ROM $19.95

Select among any of two different hard disk boot files, two different floppy boot files, or your BASIC ROM at power-up. XT-ROM gives your system that "professional touch". Great for unattended BBS, home security, or other fail-safe CoCo applications.

Wild & MV Version 2.1

Use "wildcards" with most OS9 commands, or rearrange your directory tree. Features recursive directory searches. A hard disk must! $19.95

EZGen Version 1.06

Powerful OS9 bootfile editor. Change module names, add or delete modules, patch bytes, or rearrange modules. Works on other files, too. $19.95

OS9 Utilities

HYPER-I/O

Now BASIC runs hard drives, big floppies, and more!

HYPER-I/O modifies the Disk BASIC in your CoCo 1, 2, or 3 to provide a "Dynamic Disk Interface". Use your existing BASIC and M/L software with hard disk interfaces (CoCo XT, DISTO, LR), RAM Disks, and any mix of floppy drives from 160K to 720K each. Fully RESET protected, user configurable, expandable, EPROM-able HYPER-I/O V2.6B is the most versatile CoCo hard disk DOS available. *Please specify HYPER-I/O, DISTO HYPER-I/O, or LR HYPER-I/O when ordering.*

$29.95

HYPER-III (Adds RAM Disk and Print Spooler to CoCo 3 HYPER-I/O. *$12.95*

HYPER-I/O & HYPER-III work with your B&B, RGB, LR, or DISTO Hard Disk

HYPER-I/O Utilities

by Kevin Berner

The HYPER-I/O HARD DISK UTILITIES let you perform wildcard copy, delete, and search operations on your HYPER-I/O directories. Great timesaver for moving data from floppy disk to hard disk, or for BBS maintenance. Kevin's DISK DOCTOR will lock out bad sectors on your hard or floppy disks, and includes a disk-zap utility designed specifically for use with HYPER-I/O.

DISK Doctor $17.95 HYPER-I/O Hard Disk Utilities $21.95

PERTASCII $19.95

PERTASCII is a single-user or multi-user word game for Level 2 OS9. The players are yourself, the computer, other users on your system, or even friends that call in on a modem.

Great for BBS and multi-user systems . . . or play practice rounds against the computer to hone your skills! Includes a user-expandable 15,000 word dictionary.

Minimum 256K CoCo 3, Level 2 OS9, and one disk drive required. CoCo 2 and 128K owners: watch for our 128K / 64K version!

Contact Frank Hogg Labs, Howard Medical Computers, or MicroCom Technologies for information about complete Burke & Burke hard disk systems

Hardware, or What?

68B09E 2MHz Microprocessor	$14.95
4' Hard Disk Cable Set	$17.50
Blank 27128 EPROM (for HYPER-I/O)	$9.95
Hard Disk BIOS Socket Installed	$7.50

Daggorpatch

Yet another does not return!

Don't be afraid of the dungeons . . .

Only $9.95!

DAGGORPATCH puts the thrill back into your Dyna Micro Dungeons of Daggorath™ game cartridge by patching it to run from disk. Includes disk load & save, auto-repeat command, pause, DMP-100 screen dump, tape-to-disk, and more!

Burke & Burke

P.O. Box 58342 Renton, WA 98058
(206) 235-0917

MasterCard VISA

WASHINGTON RESIDENTS PLEASE ADD 8.1% SALES TAX. COD's add $2.75.
Minimum U.S. shipping & handling $3.00.
$4.00 minimum shipping to Canada.
Please allow 2 weeks for delivery. Overnight or 2-day delivery available for in-stock items.
Telephone orders call (800) 237-2409

RAINBOW CERTIFICATION SEAL

Burke & Burke Advertisement The RAINBOW June, 1989 (Composite B/W)

Copyright 1989 by Burke & Burke

```
 CANNOT DECIDE WHAT  TO DO."
4011 IFZO=3THENPRINT:LINEINPUT"P
RESS enter TO CONTINUE...";YN$
4012 IFZO=3THENCLS:PRINT"ANYTHIN
G CALLING FOR AN ALERT   MIND SU
ITS YOUR TASTES.  IN LOVEYOU ARE
 SENSITIVE BUT FICKLE ANDYOU BLA
ME YOUR OWN CHANGES OF   HEART O
N OTHERS - YOU MUST      CONCENT
RATE ON MAKING MARRIAGE"
4013 IFZO=3THENPRINT"HAPPY.  CON
TROL YOUR QUICK      TEMPER - RA
SH WORDS IN HASTE    WILL BE YOU
R UNDOING.  THE BEST OUTLET FOR
YOUR RESTLESSNESS IS HOBBIES - I
F YOU NEED A CHANGE -TAKE UP A N
EW HOBBY.":PRINT:LINEINPUT"PRESS
 enter TO CONTINUE...";YN$
4015 IFZO=4THENPRINT"YOU WERE BO
RN UNDER THE SIGN OF CANCER - TH
E CRAB.  YOU WORRY TOMUCH ABOUT
WHAT OTHERS THINK -  CONTROL YOU
R EMOTIONS.":PRINT:LINEINPUT"PRE
SS enter TO CONTINUE...";YN$
4016 IFZO=4THENCLS:PRINT"YOU ARE
 FULL OF SELF-DOUBT AND  SHYNESS
, BUT OTHERS PLACE GREAT CONFIDE
NCE IN YOU.  YOU WILL    GIVE AN
D RECEIVE DEEP, LOYAL    AFFECTI
ON - ONLY MARRY FOR LOVE - WITHO
UT IT YOU WILL NOT BE"
4017 IFZO=4THENPRINT"CONTENT.  C
HOOSE A CAREER THAT  BRINGS YOU
INTO CONTACT WITH    PEOPLE AND
ACTIVITY.  IF YOU DO NOT WORRY T
OO MUCH - YOUR HEALTHWILL BE GOO
D.":PRINT:LINEINPUT"PRESS enter
TO CONTINUE...";YN$
4020 IFZO=5THENPRINT"YOU WERE BO
RN UNDER THE SIGN OF LEO - THE L
ION.  THE WORLD LOOKSTO YOU FOR
LEADERSHIP AND       GUIDANCE.":
PRINT:LINEINPUT"PRESS enter TO C
ONTINUE...";YN$
4021 IFZO=5THENCLS:PRINT"BEWARE
OF PEOPLE WHO AGREE WITH YOU, JU
ST BECAUSE THEY WANT     FAVORS
FROM YOU.  CONTROL YOUR  TENDENC
Y TO DOMINEER - PEOPLE   ARE EAS
IER LED THAN DRIVEN.  IN WHATEVE
R CAREER YOU CHOOSE - YOU"
4022 IFZO=5THENPRINT"WILL BE AN
EXECUTIVE.  YOU WILL NEVER HAVE
TRIVIAL LOVE AFFAIRS - AND YOUR
MARRIAGE WILL BE     HAPPY IF YO
U AVOID DOMESTIC     QUARRELS.":
PRINT:LINEINPUT"PRESS enter TO C
ONTINUE...";YN$
4025 IFZO=6THENPRINT"YOU WERE BO
RN UNDER THE SIGN OF VIRGO - THE
 VIRGIN.  YOUR LIFE  WILL NOT BE
 WASTED - AND YOU    WILL NEVER
REGRET WHAT YOU HAVE DONE.":PRIN
T:LINEINPUT"PRESS enter TO CONTI
NUE...";YN$
4026 IFZO=6THENCLS:PRINT"IF YOU
ACHEIVE FAME - YOU WILL  EARN IT
.  YOUR GREATEST SUCCESS WILL BE
 IN A CAREER REQUIRING   PATIENC
E.  USE TACT WITH OTHERS - DO NO
T BE OVER CRITICAL.      MARRY E
ARLY IN LIFE - AND DO NOT"
4027 IFZO=6THENPRINT"INSIST ON A
LWAYS HAVING YOUR    WAY.":PRINT
:LINEINPUT"PRESS enter TO CONTIN
UE...";YN$
4030 IFZO=7THENPRINT"YOU WERE BO
RN UNDER THE SIGN OF LIBRA - THE
 BALANCE.  YOU ARE   ABLE TO GET
 ALONG WITH PEOPLE   EASILY - TH
IS HELPS YOU MAKE    FRIENDS AND
 SUCCEED IN BUSINESS.":PRINT:LIN
EINPUT"PRESS enter TO CONTINUE..
.";YN$
4031 IFZO=7THENCLS:PRINT"YOU WIL
L MAKE A GOOD EXECUTIVE  OR MANA
GER.  NEVER LISTEN TO    ADVICE
TO USE FORCE - YOU WILL  SUCCEED
 BETTER BY USING REASON  AND PER
SUATION.  IN LOVE YOU    MUST RE
MEMBER THAT EMOTIONS AND"
4032 IFZO=7THENPRINT"NOT REASON
ARE THE SOURCE OF    PEOPLE'S AC
TIONS.  IN MARRIAGE  YOUR SPOUSE
 DEMANDS ALL OF YOUR AFFECTION A
ND WILL RESENT YOUR  INTEREST TO
 OTHERS OF THE       OPPOSITE SE
X.":PRINT:LINEINPUT"PRESS enter
TO CONTINUE...";YN$
4035 IFZO=8THENPRINT"YOU WERE BO
RN UNDER THE SIGN OF SCORPIO - T
HE SCORPION.  YOU    WERE BORN T
O FIGHT HARD, LOVE   DEEPLY, AND
 HATE BITTERLY.":PRINT:LINEINPUT
"PRESS enter TO CONTINUE...";YN$
4036 IFZO=8THENCLS:PRINT"FOR PEA
CE OF MIND - YOU MUST    CONTROL
 YOUR TEMPER, CONTROL    YOUR VI
OLENT HATES, AND DO NOT  GIVE IN
TO SUSPICION OR JEALOUSY.NO ONE
WILL ACCUSE YOU OF LYING DOWN ON
 THE JOB.  YOU WILL"
4037 IFZO=8THENPRINT"SUCCEED IN
MANY LINES OF        ACTIVITY.
YOU WILL ATTRACT THE OPPOSITE SE
X - BUT YOUR GREATESTPITFALL IS
JEALOUSY.":PRINT:LINEINPUT"PRESS
 enter TO CONTINUE...";YN$
4040 IFZO=9THENPRINT"YOU WERE BO
RN UNDER THE SIGN OF SAGITTARIUS
 - THE ARCHER.  YOU  HAVE A GOOD
 CHANCE TO ACHEIVE   SUCCESS AND
 FAME.":PRINT:LINEINPUT"PRESS en
ter TO CONTINUE...";YN$
4041 IFZO=9THENCLS:PRINT"SELECT
A CAREER WHERE YOU DO NOTWORK WI
TH TOO MANY OTHERS.  YOU WILL SE
LDOM QUARREL, BUT WILL   FLARE U
P IF CROSSED.  YOU WILL  HAVE GO
OD LUCK IF YOU FOLLOW    YOUR IN
STINCTS.  IN LOVE NO ONE"
4042 IFZO=9THENPRINT"WILL QUITE
LIVE UP TO YOUR IDEAL- LEARN TO
LOOK AT THE GOOD     QUALITIES A
ND OVERLOOK THE      FAULTS.":PR
INT:LINEINPUT"PRESS enter TO CON
TINUE...";YN$
4045 IFZO=10THENPRINT"YOU WERE B
ORN UNDER THE SIGN OF CAPRICORN
- THE SEA-GOAT.  YOU MUST DEVEL
OPE A SENSE OF HUMOR.":PRINT:LIN
EINPUT"PRESS enter TO CONTINUE..
.";YN$
4046 IFZO=10THENCLS:PRINT"BE CAR
EFUL NOT TO MISS OUT ON  OPPORT
UNITIES WHICH REQUIRE    IMAGIN
ATION AND DARING.  CHOOSE A CARE
ER WHICH REQUIRES A      STEADY
, LEVEL HEAD.  IN LOVE YOUARE CA
UTIOUS AND HESITANT - YOU"
4047 IFZO=10THENPRINT"WILL PROBA
LLY NOT MARRY EARLY - BUT TO BE
HAPPY - YOU MUST     MARRY.  GE
T PLENTY OF FRESH AIR,AVOID WORR
Y, AND WATCH YOUR USE OF ALCOHOL
 AND TOBACCO.":PRINT:LINEINPUT"P
RESS enter TO CONTINUE...";YN$
4050 IFZO=11THENPRINT"YOU WERE B
ORN UNDER THE SIGN OF AQUARIUS -
 THE WATER-BEARER.   YOU HAVE M
ANY GOOD QUALITIES, SOYOU MUST O
VERCOME YOUR SHYNESS  IN HUMAN R
ELATIONSHIPS.":PRINT:LINEINPUT"P
RESS enter TO CONTINUE...";YN$
4051 IFZO=11THENCLS:PRINT"YOU HA
VE AN ORIGINAL MIND - RELYON YOU
R HUNCHES.  YOU DO NOT   MAKE F
RIENDS QUICKLY - BUT YOU  WILL N
EVER LACK FOR THEM - YOU  MUST B
E PATIENT WITH THOSE NOT  AS QUI
CK AS YOU.  YOUR EASY"
4052 IFZO=11THENPRINT"GOING DISP
OSITION COULD LESSEN  YOUR SUCCE
SS, BUT MANY CAREERS  HOLD OPPOR
TUNITIES FOR YOU.  IN LOVE YOU H
IDE YOUR AFFECTIONS - YOU MAY MA
RRY WITHOUT A ROMANTICCOURTSHIP.
":PRINT:LINEINPUT"PRESS enter TO
 CONTINUE...";YN$
4055 IFZO=12THENPRINT"YOU WERE B
ORN UNDER THE SIGN OF PISCES - T
HE FISHES.  YOUR LIFE WILL BE FI
LLED WITH RESTLESS    ACTIVITY."
:PRINT:LINEINPUT"PRESS enter TO
CONTINUE...";YN$
4056 IFZO=12THENCLS:PRINT"YOU AR
E VERY EASILY TAKEN      ADVANT
AGE OF.  YOUR FRIENDS    OVERLO
OK YOUR FAULTS AND HAVE  GENUIN
E AFFECTION FOR YOU.  WITHSELF-D
ISCIPLINE YOU CAN RISE TO GREAT
HEIGHTS - CHOOSE A CAREER"
4057 IFZO=12THENPRINT"THAT DEALS
 WITH NUMBERS OF      INDIVIDUAL
S.  YOU WILL PROBALLY MARRY EARL
Y - HAVE SEVERAL LOVE AFFAIRS -
SOME MAYBE AFTER YOU  HAVE MARRI
ED.":PRINT:LINEINPUT"PRESS enter
 TO CONTINUE...";YN$
4060 CLS:RETURN
4500 '*** DECAN ANSWERS
4501 IFZO=1ANDDE=1THENPRINT"MARR
Y SOMEONE BORN IN LAST HALF OF M
ARCH OR UNDER CANCER OR    SAGI
TTARIUS.  LUCKY COLORS ARE  RED
AND YELLOW, BEST DAY IS    FRID
AY, AND GOOD FORTUNE NUMBER IS 2
."
4502 IFZO=1ANDDE=2THENPRINT"MARR
Y SOMEONE BORN UNDER ARIES, LEO
OR SAGITTARIUS.  LUCKY     COLO
RS ARE TAN AND ORANGE, BEST DAY
```

"Simply Better" Word Processor

*RUN 2 INTERACTING WORD PROCESSORS SIMULTANEOUSLY * PERFORM MAIL-MERGES * CREATE INDEXES * CREATE TABLE OF CONTENTS * PRINT-FILL FORMS * DISPLAYS FONTS IN SELECTED COLORS * DISPLAYS UNDERLINING * PRINT SPOOLING * AUTO SAVES FILES * SERIAL/PARALLEL OUTPUT * PRINT/SAVE BLOCKS OF TEXT * HEARING IMPAIRED MODE * UP TO 480K OF TEXT STORAGE * SORT SECTIONS OF TEXT * MANY MORE FEATURES *

". . . An excellent choice at an unbelievable price."
— Rainbow Magazine

RAINBOW CERTIFICATION SEAL

Special Intro Price... 29^{95}

SEE REVIEW AND ARTICLE IN APRIL '89 RAINBOW, SEE WHY . . .

When It Comes To Word Processing, we're... "Simply Better"

Call for a Free Brochure
All Orders, Call... 1-800-248-8420
For Color Computer 3 only. Please add $3 S/H

MasterCard VISA

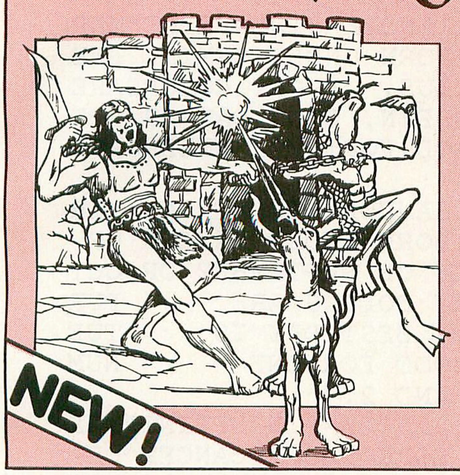
Simply Better Software
P.O. Box 20726
Portland, OR 97220

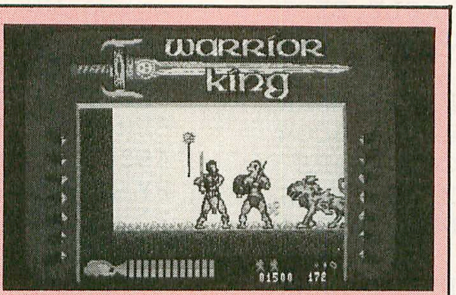
TECHNICAL ASSISTANCE
9 AM - 5 PM
(503) 254-7225

```
IS TUESDAY, AND GOOD FORTUNENUMB
ER IS 8."
4503 IFZO=1ANDDE=3THENPRINT"MARR
Y SOMEONE BORN IN FIRST HALFOF A
PRIL OR UNDER LEO OR        SAGI
TTARIUS.  LUCKY COLORS ARE  YELL
OW, LIGHT GREEN AND BLUE,   BEST
 DAY IS MONDAY, AND GOOD    FORT
UNE NUMBER IS 1."
4504 IFZO=2ANDDE=1THENPRINT"MARR
Y SOMEONE BORN IN LAST HALF OF A
PRIL OR AUGUST OR UNDER     CAPR
ICORN.  LUCKY COLORS ARE    YELL
OW AND ORANGE, BEST DAY IS  FRID
AY, AND GOOD FORTUNE NUMBER IS 5
."
4505 IFZO=2ANDDE=2THENPRINT"MARR
Y SOMEONE BORN UNDER TAURUS OR C
APRICORN.  LUCKY COLORS ARE PALE
 GREEN AND BLUE, BEST DAY ISTUES
DAY, AND GOOD FORTUNE NUMBERIS 6
."
4506 IFZO=2ANDDE=3THENPRINT"MARR
Y SOMEONE BORN UNDER TAURUS,VIRG
O OR CAPRICORN.  LUCKY      COLO
RS ARE BLUE, GRAY, AND      BROW
N, BEST DAY IS TUESDAY, AND GOOD
 FORTUNE NUMBER IS 6."
4507 IFZO=3ANDDE=1THENPRINT"MARR
Y SOMEONE BORN IN LAST HALF OF M
AY, SEPTEMBER OR JANUARY.   LUCK
Y COLORS ARE BLUE, GREEN ANDGRAY
, BEST DAY IS WEDNESDAY, ANDGOOD
 FORTUNE NUMBER IS 6."
4508 IFZO=3ANDDE=2THENPRINT"MARR
Y SOMEONE BORN UNDER LIBRA  OR A
QUARIUS.  LUCKY COLORS ARE  GREE
N, YELLOW AND PALE BLUE,    BEST
 DAY IS WEDNESDAY, AND GOOD FORT
UNE NUMBER IS 5."
4509 IFZO=3ANDDE=3THENPRINT"MARR
Y SOMEONE BORN UNDER LIBRA  OR A
QUARIUS.  LUCKY COLORS ARE  GOLD
EN TAN AND GRAYISH BLUE,    BEST
 DAY IS WEDNESDAY, AND GOOD FORT
UNE NUMBERS ARE 8 AND 5."
4510 IFZO=4ANDDE=1THENPRINT"MARR
Y SOMEONE BORN IN LAST HALF OF J
UNE, OCTOBER OR FEBRUARY.   LUCK
Y COLORS ARE LIGHT YELLOW,  BLUE
 AND GREEN, BEST DAY IS     MOND
AY, AND GOOD FORTUNE NUMBER IS 2
."
4511 IFZO=4ANDDE=2THENPRINT"MARR
Y SOMEONE BORN UNDER SCORPIOOR P
ISCES.  LUCKY COLORS ARE    VIOL
ET AND GREEN, BEST DAY IS   MOND
AY, AND GOOD FORTUNE NUMBERSARE
2 AND 5."
4512 IFZO=4ANDDE=3THENPRINT"MARR
Y SOMONE BORN UNDER CANCER, SCOR
PIO OR PISCES.  LUCKY COLORSARE
SILVER GRAY AND VIOLET, BESTDAYS
 ARE MONDAY AND WEDNESDAY,  AND
GOOD FORTUNE NUMBER IS 3."
4513 IFZO=5ANDDE=1THENPRINT"MARR
Y SOMEONE BORN UNDER ARIES  OR S
AGITTARIUS OR IN LAST HALF  OF J
ULY.  LUCKY COLORS ARE      GREE
N, ORANGE AND GOLD, BEST DAYIS S
UNDAY, AND GOOD FORTUNE     NUMB
ER IS 1."
4514 IFZO=5ANDDE=2THENPRINT"MARR
Y SOMEONE BORN UNDER ARIES, LEO
OR SAGITTARIUS.  LUCKY      COLO
RS ARE PURPLE AND GOLD, BESTDAY
IS SUNDAY, AND GOOD FORTUNE NUMB
ER IS 2."
4515 IFZO=5ANDDE=3THENPRINT"MARR
Y SOMEONE BORN UNDER ARIES, LEO
OR SAGITTARIUS.  LUCKY      COLO
RS ARE APRICOT, SCARLET AND VERM
ILION, BEST DAY IS THURSDAY,AND
GOOD FORTUNE NUMBER IS 9."
4516 IFZO=6ANDDE=1THENPRINT"MARR
Y SOMEONE BORN IN LAST HALF OF A
PRIL, AUGUST OR DECEMBER.   LUCK
Y COLORS ARE BLUE AND GREEN,BEST
 DAYS ARE SUNDAY AND        TUES
DAY, AND GOOD FORTUNE NUMBERIS 5
."
4517 IFZO=6ANDDE=2THENPRINT"MARR
Y SOMEONE BORN UNDER TAURUS,VIRG
O OR CAPRICORN.  LUCKY      COLO
RS ARE DARK BLUE AND SLATE, BEST
 DAY IS WEDNESDAY, AND GOOD FORT
UNE NUMBER IS 4."
4518 IFZO=6ANDDE=3THENPRINT"MARR
Y SOMEONE BORN UNDER TAURUS,VIRG
O OR CAPRICORN.  LUCKY      COLO
RS ARE LIGHT BLUE AND GREEN,BEST
 DAY IS SATURDAY, AND GOOD  FORT
UNE NUMBER IS 8."
4519 IFZO=7ANDDE=1THENPRINT"MARR
Y SOMEONE BORN IN LAST HALF OF J
ANUARY, MAY OR SEPTEMBER.   LUCK
Y COLORS ARE PALE BLUE AND  YELL
OW, BEST DAY IS FRIDAY, AND GOOD
 FORTUNE NUMBER IS 6."
4520 IFZO=7ANDDE=2THENPRINT"MARR
Y SOMEONE BORN UNDER ANY    SIGN
 EXCEPT SAGITTARIUS OR      CANC
ER.  LUCKY COLORS ARE GREEN AND
PINK, BEST DAYS ARE FRIDAY  AND
MONDAY, AND GOOD FORTUNE    NUMB
ER IS 6."
4521 IFZO=7ANDDE=3THENPRINT"MARR
Y SOMEONE BORN UNDER LIBRA, AQUA
RIUS OR GEMINI.  LUCKY      COLO
RS ARE PALE BLUE AND VIOLET,BEST
 DAY IS WEDNESDAY, AND GOOD FORT
UNE NUMBER IS 5."
```

SUNDOG SYSTEMS

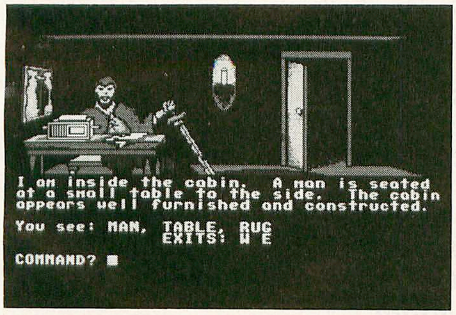
Warrior King





Become RASTANN, Warrior King, on the quest to regain his rightful crown, hidden deep within a sinister land. Battle monsters, gain magic and weapons, and travel through harsh wilderness and dark castle dungeons in this medieval realm. From the creator of *Kung-Fu Dude* comes this awesome arcade game for the CoCo III! *Warrior King* uses the most detailed 320x200 16 color graphics and high speed machine code to vault you into a world of fantasy. Dare ye challenge the many perils ahead in order to become WARRIOR KING? Req. 128K CoCo III, disk drive, and joystick. Only $29.95.

In Quest of the Star★Lord



```
I am inside the cabin.  A man is seated
at a small table to the side.  The cabin
appears well furnished and constructed.
You see: MAN, TABLE, RUG
           EXITS: N E
COMMAND? ■
```

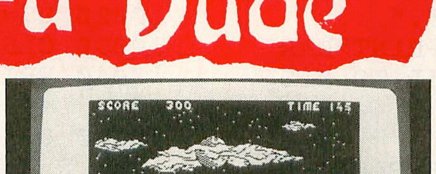
This is THE graphic adventure for the CoCo III! Unparalleled 320x200 animated graphics will leave you gasping for more! You quest for the Phoenix Crossbow in this post-holocaust world of science and fantasy. *In Quest of the Star Lord* is a full 4 disk sides of mind-numbing adventure! Req. 128K CoCo III and disk drive. Only $34.95. Hint Sheet: $3.95.

"A dynamite program! The best graphics I've seen to date on the CoCo III. You have to see it to believe it."
— 8/88 Rainbow review

Kung-Fu Dude

An exciting arcade game. The BEST karate game ever created for the CoCo! Destroy opponents and evade obstacles as you grow ever closer to your ultimate objective. Spectacular graphics, sound effects, and animation! Req. 64K CoCo, disk drive, and joystick. Only $24.95.

"The CoCo karate gap has been filled and Kung-Fu Dude *does it excellently. I highly recommend it!"*
— 2/88 Rainbow review



All programs CoCo 1, 2, 3 compatible, unless otherwise stated

HALL of the KING TRILOGY

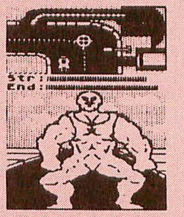
The epic adventure is back! The largest adventure campaign ever seen for the CoCo is again available! A total of six disks of intense graphic adventure will have you playing for weeks! Each section is a two-disk stand alone adventure, but all three together form an epic saga. Quest for the legendary Earthstone in the ancient dwelling of the dwarves while you enjoy the classic graphics that made this trilogy famous! Each adventure can be purchased separately for $29.95, the lowest price ever, or you can purchase the entire set for only $74.95! Req. 64K CoCo and disk drive.

"One of the best adventures I have experienced to date!" *— 6/86 Rainbow review*

"The animated graphics are dramatic, detailed, and excellent!" *—11/87 Rainbow review*

"The adventure of a lifetime. Don't miss out!" *— 7/88 Gamer's Connection review*

CHAMPION



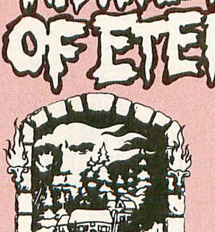
Become a superhero in this unique 64K action adventure. Great graphics and sound effects! See 5/87 Rainbow review. Disk $19.95.

DRAGONBLADE

Another great 64K animated adventure! Can you obtain the enchanted sword to slay the evil dragon? See 11/86 Rainbow review. Disk $19.95.

DRAGONBLADE

WHITE FIRE OF ETERNITY



Enter the era of monsters and magic in this splendid 64K animated adventure! See 12/86 Rainbow review. Disk $19.95.

Sundog Systems
21 Edinburg Drive
Pittsburgh, PA 15235
(412) 372-5674

Personal checks, money orders, and American C.O.D. orders accepted. Include $2.50 for S/H. $3.00 extra for C.O.D. orders. PA residents add 6% sales tax. Authorship and dealer inquires welcome.

```
4522 IFZO=8ANDDE=1THENPRINT"MARR
Y SOMEONE BORN IN LAST HALF OF J
ULY, OCTOBER OR FEBRUARY.  LUCK
Y COLORS ARE RED AND PURPLE,BEST
 DAY IS THURSDAY, AND GOOD  FORT
UNE NUMBER IS 9."
4523 IFZO=8ANDDE=2THENPRINT"MARR
Y SOMEONE BORN UNDER CANCER,SCOR
PIO OR PISCES.  LUCKY COLORSARE
RED AND BROWN, BEST DAY IS  TUES
DAY, AND GOOD FORTUNE NUMBERIS 3
."
4524 IFZO=8ANDDE=3THENPRINT"MARR
Y SOMEONE BORN UNDER CANCER,SCOR
PIO OR PISCES.  LUCKY COLORSARE
ROSE AND BLUE, BEST DAY IS  MOND
AY, AND GOOD FORTUNE NUMBER IS 2
."
4525 IFZO=9ANDDE=1THENPRINT"MARR
Y SOMEONE BORN IN JULY,     NOVE
MBER OR MARCH.  LUCKY COLORSARE
PURPLE AND YELLOW, BEST DAY IS M
ONDAY, AND GOOD FORTUNE     NUMB
ER IS 3."
4526 IFZO=9ANDDE=2THENPRINT"MARR
Y SOMEONE BORN UNDER LEO,   SAGI
TTARIUS OR ARIES.  LUCKY    COLO
RS ARE GREEN AND PURPLE,    BEST
 DAY IS TUESDAY, AND GOOD   FORT
UNE NUMBER IS 4."
4527 IFZO=9ANDDE=3THENPRINT"MARR
Y SOMEONE BORN UNDER ARIES, LEO
OR SAGITTARIUS.  LUCKY      COLO
RS ARE GOLDEN BROWN, MAGENTAAND
PUCE, BEST DAY IS SUNDAY,   AND
GOOD FORTUNE NUMBER IS 8."
4528 IFZO=10ANDDE=1THENPRINT"MAR
RY SOMEONE BORN IN LAST HALF OF
APRIL OR AUGUST.  LUCKY     COL
ORS ARE PURPLE AND BLUE, BESTDAY
 IS SATURDAY, AND GOOD      FOR
TUNE NUMBERS ARE 8 AND 5."
4529 IFZO=10ANDDE=2THENPRINT"MAR
RY SOMEONE BORN MID APRIL TO MID
 MAY, MID AUGUST TO MID     SEP
TEMBER OR LAST HALF OF      DEC
EMBER.  LUCKY COLORS ARE BLUEAND
 RED, BEST DAYS ARE SATURDAY AND
 FRIDAY, AND GOOD FORTUNE   NUM
BERS ARE 8 AND 9."
4530 IFZO=10ANDDE=3THENPRINT"MAR
RY SOMEONE BORN UNDER TAURUS,VIR
GO OR SAGITTARIUS.  LUCKY   COL
ORS ARE DEEP BLUE AND GRAY,  BES
T DAY IS WEDNESDAY, AND GOOD FOR
TUNE NUMBERS ARE 8 AND 4."
4531 IFZO=11ANDDE=1THENPRINT"MAR
RY SOMEONE BORN IN JANUARY ORUND
ER VIRGO OR LIBRA.  LUCKY   COL
ORS ARE BLUE AND GREEN, BEST DAY
 IS SATURDAY, AND GOOD      FOR
TUNE NUMBER IS 7."
4532 IFZO=11ANDDE=2THENPRINT"MAR
RY SOMEONE BORN UNDER GEMINI OR
LIBRA OR IN LAST HALF OF    JAN
UARY.  LUCKY COLORS ARE DARK BLU
E AND GREEN, BEST DAY IS    SAT
URDAY, AND GOOD FORTUNE     NUM
BER IS 9."
4533 IFZO=11ANDDE=3THENPRINT"MAR
RY SOMEONE BORN UNDER GEMINI,LIB
RA OR AQUARIUS.  LUCKY COLORSARE
 BLUE AND GREEN, BEST DAY IS FRI
DAY, AND GOOD FORTUNE NUMBERSARE
 6 AND 9."
4534 IFZO=12ANDDE=1THENPRINT"MAR
RY SOMEONE BORN UNDER CANCER OR
IN LAST HALF OF SEPTEMBER OR OCT
OBER.  LUCKY COLORS ARE     PUR
PLE AND RED, BEST DAY IS    TUE
SDAY, AND GOOD FORTUNE      NUM
BERS ARE 4 AND 2."
4535 IFZO=12ANDDE=2THENPRINT"MAR
RY SOMEONE BORN UNDER CANCER OR
SCORPIO OR IN LAST HALF OF  FEB
RUARY.  LUCKY COLORS ARE    MAU
VE, GREEN AND INDIGO, BEST  DAY
 IS THURSDAY, AND GOOD      FOR
TUNE NUMBER IS 3."
4536 IFZO=12ANDDE=3THENPRINT"MAR
RY SOMEONE BORN UNDER CANCER,SCO
RPIO OR PISCES.  LUCKY COLORSARE
 PURPLE AND RED, BEST DAY IS MON
DAY, AND GOOD FORTUNE NUMBER IS
3."
4550 PRINT:LINEINPUT"PRESS enter
 TO CONTINUE...";YN$
4560 RETURN
5000 GOTO 10000
10000 '*** END ROUTINE
10010 A$="L8;E;F;G;P16;L8;G#;G;F
;P16"
10020 B$="L2;E"
10030 CLS0
10040 PRINT@160,"
A"
10050 PRINT@224,"  P A U L   D
 B U R N H A M"
10060 PRINT@288,"             PRO
GRAM"
10070 X$="XA$;"
10080 FOR R=1TO3
10090 PLAY X$
10100 NEXT R
10110 CLS0
10120 PRINT@224,"       COPYRIGHT
 (C) 1989"
10130 X$="XB$;"
10140 PLAY X$
10150 FOR D=1TO1000:NEXT D
10160 CLS
20000 END
```

Kill the evil wizard and escape. . .

Castle Zhagwhar

By Keith Schuler

In a different time far away, the small, magical kingdom of Lithana is thriving. It is a peaceful kingdom with a just king on the throne, a good economy and happy people.

One day an evil wizard arrives at an old, abandoned fortress outside the kingdom, called Castle Zhagwhar. He is a powerful wizard who wants to rule Lithana. So using his magical powers, he begins transforming entire forests into gigantic armies of vicious goblins who immediately begin attacking Lithana.

The king's army is powerful, but they can't resist the goblins for long. So the king sends a decree throughout the kingdom that anyone brave enough to enter Castle Zhagwhar and dispatch the wizard will receive one-fourth of all the land in Lithana.

The king waits many long weeks for a response to his decree when, at last, a poor young woodcutter named Gwydion answers the king's call. Gwydion is unskilled in the use of any weapons but is very strong and can run and jump well. The king in desperation gives the young man a map leading to Castle Zhagwhar, wishes him luck, and then returns to his throne to worry some more.

Gwydion follows the map for many days but sees no goblins: They are off fighting in other parts of Lithana. At last he reaches his destination, the decrepid old fortress almost completely in shambles. The drawbridge is down and Gwydion enters. He comes to a staircase leading downwards and descends it. His adventure begins. . . .

Castle Zhagwhar is a game that runs on the CoCos 1, 2 and 3 and requires 32K of memory. To play the game, type in the listing, save it to tape or disk, and run it. You will see the title page. Press any key and the game begins.

Gwydion is the little blue man. Control him using the right joystick. Moving the joystick left or right causes him to run left or right. To climb a ladder or move under the ladder, press the joystick up. To descend a ladder, move over it, then press the joystick down. Moving the joystick down anywhere else causes Gwydion to duck. To make him jump, press the joystick button.

The idea of the game is to move from room to room by collecting yellow keys and using them to open the blue doors. To pick up a key, just run over it, and a key is shown in your possession in the blue bar at the top of the screen. To open a door, get a key, then run into the door.

Also found throughout the castle are pots of gold worth 100 points. Pick these up by running over them. Keys are worth 50 points; moving on to the next room, 350 points. The score is shown in the blue bar in the upper left-hand corner of the screen.

Castle Zhagwhar is very old, so the ladders are brittle and there are many holes in the floor. Jump over the holes, but never jump onto a ladder because it can break and may trap you in a room. There are also bats flying throughout the castle, biting anything they touch, so duck to avoid them even though sometimes they don't do damage.

Falling one level through a hole causes Gwydion to lose 10 points of life, and getting bitten subtracts five points per bite. The amount of life Gwydion has left is shown as a green bar inside the blue bar in the upper right-hand corner of the screen. If the bar is reduced to zero, Gwydion dies.

Also found in the castle are magic transporters and disintegrators. When stepped on, the transporters cause Gwydion to automatically jump to another part of the room. The disintegrators cause instant death when stepped on.

Gwydion makes a deal with his fairy godmother that if he succeeds in reaching a certain point, he can summon her aid. To do this, you must accumulate a score of at least 4000 points, then press the space bar. Gwydion's life is then completely restored, but his fairy godmother sets him back a few rooms. Another life restorer is the Bonus Room. When Gwydion is in this room, collect all the treasure and escape before the red timer runs out, and his life will be completely restored.

Scattered around the castle are bottles of magic healing elixer that Gwydion does not see right away. When he notices one, he automatically drinks it. Elixer cures five points of damage. Going to the next room also cures five points.

Deep within Castle Zhagwhar is the evil wizard. He knows the young man is after him and is constantly searching for him with a magic crystal ball. If he finds Gwydion, he puts a curse on him that drains

---

Keith Schuler is a high school student who has been programming for seven years. He has learned other computer languages including assembly and C, and intends to become a computer programmer for NASA.

the lad's life. So don't waste time! But that's not the only spell the wizard knows. He can throw fireballs, disintegrate the inanimate, cause things to disappear, magically transport himself, and summon bats. Just remember, when the wizard dies, all his spells stop working.

The castle is difficult to navigate through, making it hard to find and defeat the wizard. Escaping Castle Zhagwar is even harder. Good luck.

I hope you enjoy playing this game as much as I enjoyed programming it. Now Gwydion is prepared, the castle is before you. . . art thou ready?

[Note: To run this program on the CoCo 3, change `POKE 65495,0` in Line 80 to `POKE 65497,0`.]

(Questions or comments about this program may be sent to the author at 325 St. Pierre Ct., Merritt Island, FL 32953. Be sure to send an SASE when requesting a reply.) ☐

110	84	450	232	910	248
140	100	500	55	960	205
190	114	580	236	1040	194
230	239	640	164	1100	239
310	93	700	32	1160	242
35	62	790	129	1200	174
400	123	830	113	END	140

The Listing: ZHAGWHAR

```
10 '******************************
*
20 '*         CASTLE ZHAGWHAR
*
30 '*        BY: KEITH SCHULER
*
40 '*
*
50 '*        COPYRIGHT (C)1989
*
60 '*      FALSOFT INCORPORATED
*
70 '******************************
*
80 POKE65495,0:X=RND(-TIMER):CLE
AR150:PCLEAR2:PMODE1,1:PCLS:DIMR
R(11,15),RL(11,15),ST(11,15),DU(
11,15),FB(11,5),FL(40,8),BA(11,6
),MA(5),MB(5),MO$(5),BL(11,15),P
A(10),PB(10):CLS0:PRINT@192,"  *
* PLEASE WAIT ONE MOMENT **  ";
90 DRAW"C3BM3,14E2U2RF2ND2H2LU4L
2G2NDE2R2DNR4U4C2U2R2D2C3BM28,14
H2U2LG2ND2E2RU4R2F2NDH2L2DNL4U4C
2U2L2D2BM3,31C3U2E2F2ND2H2U4L2NG
2R2R2NF2L2U2C2H2E2F2G2NU2":GET(3
1,0)-(20,15),RL,G:GET(0,0)-(11,1
5),RR,G:GET(0,16)-(11,31),ST,G
100 DRAW"C3BM1,47E4L2C2U2L2D2R2R
2C3R4D2G2R4BM18,32D3G2H2NU3F2D4R
2NE2L2L2NH2R2D2C2G2F2E2H2D2BM100
,100NR11R2U2NR4D4NR4":GET(0,32)-
(11,47),DU,G:GET(100,98)-(111,10
3),FB,G
110 LA$="C3D24NR8U4NR8U4NR8U4NR8
U4NR8U4R8NU4D20":COLOR4:LINE(0,0
)-(40,6),PSET,B:COLOR2:LINE(0,2)
-(40,4),PSET,BF:FORT=0TO40STEP4:
PSET(T,2,4):PSET(T+2,4,4):NEXTT:
GET(0,0)-(40,6),FL,G
120 DRAW"C3BM100,50U2R4ND4R2ND4R
4D2":GET(100,48)-(111,54),BA,G:P
CLS:M$(1)="T8O3CDEFG":M$(2)="O1T
100FGFGABABCD":M$(3)="O1T3L4CP96
CL3FL4P24CFAP64CFAP64CFAFAO2CO1A
FCP64CP96CL3F":M$(4)="O3T6CDEGP8
DT5G"
130 DRAW"S4":PCLS3:FORT=80TO82:C
IRCLE(T,60),18,2,1,.15,.65:CIRCL
E(T+25,72),6,2,1,.15,.70:NEXTT:D
RAW"BM80,60C2NU14ND14BL3BD4NU11L
2NU11NM-3,+5R2U15E4R5NR5M+5,+4U2
BM105,66NM-4,-6M+6,+4D5NM-6,+4NF
4RNF4U12L2ND12NE4L2NE4NH2UH2NL4D
2L8"
140 DRAW"BM122,78NM+18,-19E2R4UN
L4R4D2NR6D2R4E4NU4L2U4NM-3,-2R2M
-4,-2L6NL4U2L6NU4R2U6R2D2NL2U4NR
4D2R8BE6BR8ND20G2ND18D2G2NR8G2NR
10R4D12F4U2NH4NE2U2H4BU18BR14ND2
2R2ND22NE4L2NE4NH2D22F4U2NH4E2BR
20BD2G2L8UNR6H2R2ND2NL4NU16L2U16
M+4,-2NM+8,+4D2M+8,+4M-10,+8"
150 DRAW"BM30,90E4NM+6,+2D2M+6,+
2M+18,-2NM-10,+12NM-14,+12M-12,+
12BL8NG4NR16G2R16NE4L8NM-14,+12L
2NM-12,+12M-10,+12NG2NM+18,-2M+1
8,-4L2F2NM+4,+4M+4,+2E4BF4NR6F2R
NU24R2U24NE2L2NH2R2D10E6NM+4,+5D
2M+4,+5ND16R2D16NM-8,+2U2M-8,+4"
160 FORT=91TO93:CIRCLE(T,111),6,
2,1,.15,.70:NEXTT:DRAW"BM91,104N
M-4,-6M+6,+4D5NM-6,+4NF4RNF4U12L
2ND12NE4L2NE4NH2UH2NL4D2L8BR24BU
2ND10R2ND10NR8E2R6ND15F2ND17R2NE
2R2NE2L4D17M+4,+4L2NM-4,-4R2D4G2
NL2U2L13NG2E2NR10R2BU12M+6,+3BR1
6U15M-2,-4NM+2,-4R2M+2,+4D15
170 DRAW"NM+6,+4L2M+8,+4E2U12NM-
2,-4R2NM-2,-4D10NM+6,+4L2M+8,+4E
2U12NM-2,-4R2NM-2,-4D10BR5BD2NR6
F2RNU24R2U24NE2L2NH2R2D10E6NM+4,
+5D2M+4,+5ND16R2D16NM-8,+2U2M-8,
+4":FORT=190TO193:CIRCLE(T,111),
6,2,1,.15,.70:NEXTT
180 DRAW"BM191,104NM-4,-6M+6,+4D
5NM-6,+4NF4RNF4U12L2ND12NE4L2NE4
NH2UH2NL4D2L8BR26ND15NH4R2NH4D15
NF4D2NL2U15M+6,-5NF4ND2C1S8BM18,
4NR4D2R4D2NL4BR2U4R4D2NL4BD2BR2U
```

```
2E2F2NL4D2BR2NR4U4R4BR2NR4D2NR2D
2R4BR2NR4U4R4BR2NR4D4R4NU4BR2U2E
2F2NL4D2BR2R4U2L4U2R4BR2R4L2"
190 DRAW"D4BU4BR6BD4R4U2L4U2R4BR
2ND4R4D4NL4BR2U2NR2U2R4BR2R4L2D4
BR4NU4R2NU2R2NU4BR2U2NR4E2F2D2BR
2U4R4D2L4R2F2BR2NR4U2NR2U2R4BM83
,16ND4R4D2NL4U2BR2ND4R4D2L4R2F2B
R2NR4U2NR2U2R4BR2NR4D2R4D2NL4BR2
NR4U2NR2U2R4BR2ND4F4U4BR2R4L2D4B
R4R4U2L4U2R4"
200 DRAW"BM36,150U4R3FGNL3FGNL3B
R5U2NH2E2BR6D4U2R2NE2F2BR2NR4U2N
R2U2R4BR2R4L2D4NL2R2BR4U4NL2R2BR
2D4U2R4NU2D2BR6R4U2L4U2R4BR2NR4D
4R4BR2U4D2R4NU2D2BR2NU4R4U4BR2D4
R4BR2NR4U2NR2U2R4BR2ND4R4D2L4R2F
2BM90,154GD2FBR2NR4U4R4BR2FD2GBR
9U4BR2ND2R4D2NL4D2BR2"
210 DRAW"NR4U2NR4U2R4ND4BR2R4G2D
2C4BM53,178ND4R4D2NL4U2BR2ND4R4D
2L4R2F2BR2NR4U2NR2U2R4BR2NR4D2R4
D2NL4BR2R4U2L4U2R4BR6BD4U2NR4E2F
2D2BR2U4F4U4BR2F2NE2D2BR10U4D2R2
NE2F2BR2NR4U2NR2U2R4BR2F2NE2D2":
SCREEN1,1
220 FORT=1TO2500:A$=INKEY$:IFA$=
""THENNEXTT
230 SCREEN0,0:DRAW"S4":SC=0:ST=2
50:S=1:WR=10:L1=63:L2=102:L3=143
:L4=182:FF=0:WW=1:FG=0
240 IF(S=5 OR S=10)AND TI>1 THEN
ST=250
250 TR=0:ON S GOTO 270,290,310,3
70,270,320,340,320,370,360,420
260 PMODE1,1:PCLS:SCREEN0,0:FORT
=6TO220STEP40:PUT(T,61)-(T+40,67
),FL,PSET:PUT(T,100)-(T+40,106),
FL,PSET:PUT(T,141)-(T+40,147),FL
,PSET:PUT(T,180)-(T+40,186),FL,P
SET:NEXTT:COLOR2:LINE(0,0)-(255,
20),PSET,B:PAINT(10,10),3,2:RETU
RN
270 GOSUB260:FORT=1TO3:READLX,LY
:DRAW"BM"+STR$(LX)+","+STR$(LY)+
LA$:NEXTT:DATA230,139,10,98,210,
58,60,139,8,98,62,58,30,139,90,1
39,190,139,234,99,148,99,10,58,2
00,139,10,98,210,58
280 LINE(118,30)-(131,160),PRESE
T,BF:GOTO510
290 GOSUB260:FORT=1TO3:READLX,LY
:DRAW"BM"+STR$(LX)+","+STR$(LY)+
LA$:DRAW"BM"+STR$(LX+170)+","+ST
R$(LY)+LA$:NEXTT
300 LINE(82,70)-(166,190),PRESET
,BF:GOTO510
310 GOSUB260:LINE(61,98)-(72,147
),PRESET,BF:LINE(46,179)-(84,191
),PRESET,BF:LINE(110,139)-(140,1
47),PRESET,BF:FORT=1TO6:READLX,L
Y:DRAW"BM"+STR$(LX)+","+STR$(LY)
+LA$:NEXTT:LINE(169,99)-(200,110
),PRESET,BF:GOTO510
320 GOSUB260:COLOR2:LINE(42,141)
-(207,141),PSET:COLOR1:LINE(45,1
74)-(59,191),PSET,BF:LINE(90,174
)-(98,191),PSET,BF:LINE(106,174)
-(118,191),PSET,BF:LINE(170,174)
-(158,191),PSET,BF:LINE(192,174)
-(206,191),PSET,BF:LINE(55,136)-
(195,147),PSET,BF
330 LINE(195,107)-(115,100),PSET
,BF:LINE(50,58)-(70,68),PSET,BF:
FOR T=1TO5:READLX,LY:DRAW"BM"+ST
R$(LX)+","+STR$(LY)+LA$:NEXTT:GO
TO510:DATA230,139,10,98,38,58,23
0,58,74,58
340 GOSUB260:COLOR1:LINE(40,175)
-(255,191),PSET,BF:LINE(45,134)-
(59,151),PSET,BF:LINE(90,134)-(9
8,151),PSET,BF:LINE(106,134)-(11
8,151),PSET,BF:LINE(170,134)-(15
8,151),PSET,BF:LINE(192,134)-(20
6,151),PSET,BF:LINE(70,54)-(200,
70),PSET,BF
350 LINE(135,90)-(200,120),PSET,
BF:DRAW"C2BM245,100L12":FORT=1TO
3:READLX,LY:DRAW"BM"+STR$(LX)+",
"+STR$(LY)+LA$:NEXTT:GOTO510:DAT
A205,58,220,98,10,139,230,139,10
,98,38,58,230,58,74,58
360 GOSUB260:COLOR1:LINE(135,58)
-(195,191),PSET,BF:LINE(65,58)-(
79,160),PSET,BF:DRAW"C3BM37,180R
14BM65,180R14BM88,180R14C2BM215,
180R14":FORT=1TO3:READLX,LY:DRAW
"BM"+STR$(LX)+","+STR$(LY)+LA$:N
EXTT:GOTO510:DATA12,99,121,58,12
1,139
370 PCLS1:DRAW"S8BM70,90C3NR3D4R
3EHNL3EHBR3NR4D4R4NU4BR2U4F4U4BR
2D4R4U4BR2NR4D2R4D2NL4BR6U4R4D2L
4R2F2BR2NR4U4R4D4BR2NR4U4R4D4BR2
U4F2E2D4BR2BU4D2BD2RC1D":FORT=1T
O65STEP4:COLOR2:LINE(T,T)-(256-T
,192-T),PSET,B:COLOR4
380 LINE(T+2,T+2)-(256-(T-2),192
-(T-2)),PSET,B:NEXTT:SCREEN1,0:P
LAY"T4L4V31O3L16.;1;L32;1;L16.;1
;L32;1;L16.;1;L32;1;L16.;1;L32;5
;L16.;8;L32;5;L16.;8;L32;5;L16.;
8;L32;5;L4;1":FORT=1TO500:NEXTT:
LF=ST:TI=82:GOSUB260
390 DRAW"S4":COLOR4:LINE(0,24)-(
80,24),PSET:COLOR1:LINE(100,139)
-(130,147),PSET,BF:LINE(45,179)-
(80,191),PSET,BF:LINE(148,90)-(2
00,147),PSET,BF:DRAW"BM11,139"+L
A$:DRAW"BM136,139"+LA$:DRAW"BM86
```

```
,139"+LA$:DRAW"BM136,99"+LA$:DRA
W"BM204,99"+LA$
400 LINE(0,99)-(70,106),PRESET,B
F:DRAW"BM236,59"+LA$:DRAW"BM74,5
9"+LA$
410 GOTO 510
420 GOSUB260:LINE(0,22)-(255,191
),PRESET,BF:DRAW"S8C2BM36,34NR4D
4R4BR2NR4U4R4D4BR2U4F4U4BR2BD4R4
U2NL2D2L4U4R4BR2ND4R4D2L4R2F2BR2
U2NR4E2F2D2BR4U4NL2R2BR2D4R4U4BR
2D4R4BR2U2NR4E2F2D2BR4U4NL2R2BR2
R4L2D4NL2R2BR2NR4U4R4D4BR2U4F4U4
BR2BD4R4U2L4U2R4BR2D2BD2UC1R"
430 GOSUB660:PLAY"O2T5V31L1GCL2E
GL3.AL4EL1AO3CL2DO2GO3L1C":DRAW"
C4S8BM20,65R4L2D4BR4U4D2R4NU2D2B
R2NR4U2NR2U2R4BR6D4R2NU2R2U4BR2R
4L2D4NL2R2BR2NR4E4NL4BR2BD4U2NR4
E2F2D2BR2U4R4D2L4R2F2BR2U4R3FD2G
NL3BR7U4D2R4U2D4BR2U2NR4E2F2D2BR
2R4U2L4U2R4BR6D4R3EHNL3EH
440 DRAW"NL3BR3NR4D2NR2D2R4BR2NR
4U2NR2U2R4BR2ND4F4U4BM0,80NR4D2R
4D2NL4BR2NU4R4U4BR2NR4D4R4BR2NR4
U4R4BR2NR4D2NR2D2R4BR2R4U2L4U2R4
BR2NR4D2R4D2NL4BR2U2NR2U2R4BR2D4
R4U4BR2D4R4BR2NU4R4BR3U2NH2E2BR5
D4R3EU2HNL3BR3NR4D2NR2D2R4BR2R4U
2L4U2R4BR2R4L2D4BR4U4R4D2L4"
450 DRAW"R2F2BR2NR4U4R4D4BR4U2NH
2E2BR2NR4D2NR2D2R4BR2NU4R3EU2HNL
3C3":PLAY"O2AL2O3CO2AGABO3CO2F#A
O3DCL4O2BP4L2GFD":DRAW"BM4,110U2
NR4E2F2D2BR2U4F4U4BR2NR3D4R3EU2N
HBUBR6F2NE2D2BR4NR4U4R4D4BR2NU4R
4U4BR6NR4D2R4D2NL4"
460 DRAW"BR2U2NR4E2F2D2BR2U2NR2U
2R4BR2NR4D2NR2D2R4BR2BU4D4R4BR4U
2NH2E2BR4NR4D2NR2D2R4BR2R4U2L4U2
R4BR2NR4D4R4BR2U2NR4E2F2D2BR2U4R
4D2NL4U2BR2NR4D2NR2D2R4BR2NU4R3E
U2HL3BM38,118NR4D4R4BR2U2NR4E2F2
D2BR2R4U2L4U2R4BR2R4L2D4BR4NU4R4
BR2NR4U2NR2U2R4BR6"
470 DRAW"R4G4R4BR2U4D2R4NU2D2BR2
U2NR4E2F2D2BR2R4U2NL2D2L4U4R4BR2
D4R2NU2R2U4BR2D4U2R4NU2D2BR2U2NR
4E2F2D2BR2U4R4D2L4R2F2":PLAY"O3L
1CL2EGL3AP4EL1AO4L1CL2DO3GO4L1C"
:DRAW"C4BM34,140D4R4BR2R4L2U4NL2
R2BR2R4L2D4BR4U4D2R4NU2D2BR2U2NR
4E2F2D2BR2U4F4U4BR2BD4U2NR4E2
480 DRAW"F2D2BR6R4L2U4NL2R2BR2NR
4D2R4D2NL4BR6R4U2L4U2R4BR2BD4U2N
R4E2F2D2BR2BU4D2F2E2U2BR2NR4D2NR
2D2R4BR2NU4R3EU2HL3BR6D4UC1R":CO
LOR3:LINE(34,152)-(218,152),PSET
:PLAY"O3AL2O4CO3AGABO4CL4EP8L8GL
4F#GO4DP8O3L8GL4F#GL1O4CCC"
490 DRAW"C2BM85,170R4L2D4BR4U4D2
R4NU2D2BR2NR4U2NR2U2R4BR6NR4D2NR
2D2R4BR2U4F4U4BR2NR3D4R3EU2"
500 FORT=1TO6000:IF INKEY$="" TH
EN NEXT T:CLS:END ELSE CLS:END
510 PN=2:TR=0:ON S GOSUB 530,540
,550,590,530,560,580,560,590,570
:PB$="S2C3NR10U2L2NR14U2L2NR18U2
L2NR22U2NR22U2NR22U2NR22U2NR22BU
2BR2C2R18L2U2L14R2U2R10":FORT=1T
O PN:DRAW"BM"+STR$(PA(T))+","+ST
R$(PB(T))+PB$:NEXTT
520 GOTO 600
530 TN(1)=0:TN(2)=0:TN(3)=0:PA(1
)=100:PB(1)=179:PA(2)=190:PB(2)=
99:X=10:Y=164:KA=20:KB=53:LA=235
:LB=43:RETURN
540 PA(1)=40:PB(1)=99:PA(2)=184:
PB(2)=99:X=10:Y=164:KA=128:KB=53
:LA=190:LB=163:RETURN
550 PA(1)=50:PB(1)=139:PA(2)=128
:PB(2)=99:X=10:Y=164:KA=210:KB=9
3:LA=235:LB=43:RETURN
560 RA=45:RB=124:PA(1)=100:PB(1)
=99:PA(2)=10:PB(2)=59:X=10:Y=164
:KA=140:KB=53:LA=198:LB=83:RETUR
N
570 PA(1)=238:PB(1)=99:PA(2)=238
:PB(2)=139:X=10:Y=44:LA=7:LB=164
:KB=53:KA=235:WY=Y:RETURN
580 PA(1)=238:PB(1)=99:PA(2)=238
:PB(2)=139:X=35:Y=164:KA=50:KB=5
3:LA=235:LB=43:RA=12:RB=44:RETUR
N
590 PN=10:PA(1)=58:PB(1)=139:PA(
2)=220:PB(2)=139:PA(3)=238:PB(3)
=179:PA(4)=220:PB(4)=99:PA(5)=19
8:PB(5)=179:PA(6)=12:PB(6)=59:PA
(7)=42:PB(7)=59:PA(8)=102:PB(8)=
99:PA(9)=108:PB(9)=59:PA(10)=190
:PB(10)=59:X=34:Y=164:LA=232:LB=
123:KA=115:KB=173:RETURN
600 DRAW"S4BM"+STR$(KA)+","+STR$
(KB)+"C2D4L2U2NU2R8D2":DRAW"BM"+
STR$(LA)+","+STR$(LB)+"C3BD2ND13
E2R7F2D13L9":PAINT(LA+2,LB+2),3,
3:DRAW"BM"+STR$(LA+2)+","+STR$(L
B+8)+"C1R2C3D":RN=0:BN=0:ON S GO
TO 660,610,620,660,620,660,640,6
20,660,630
610 BN=2:BX(1)=10:BY(1)=44:BD(1)
=1:BX(2)=230:BY(2)=44:BD(2)=0:GO
TO650
620 BN=2:BX(1)=10:BY(1)=124:BD(1
)=0:BX(2)=100:BY(2)=44:BD(2)=0:I
F S=4 THEN BX(1)=31:GOTO650 ELSE
IF S=7 THEN BY(1)=84:GOTO650 ELS
E GOTO650
630 BN=4:BX(1)=70:BY(1)=84:BD(1)
=1:BX(2)=120:BY(2)=44:BD(2)=0:BX
(3)=100:BY(3)=124:BD(3)=1:BX(4)=
100:BY(4)=164:BD(4)=1:GOTO650
```

```
640 BN=2:BX(1)=120:BY(1)=44:BD(1
)=0:BX(2)=100:BY(2)=124:BD(2)=1:
GOTO650
650 IFBN>0THENFORT=1TOBN:PUT(BX(
T),BY(T))-(BX(T)+11,BY(T)+6),BA,
PSET:NEXTT
660 DRAW"BM6,6C1S8NR4D2R4D2NL4BR
2NR4U4R4BR2ND4R4D4NL4BR2U4R4D2L4
R2F2BR2NR4U2NR2U2R4BR2BDRBD2LRC3
U3BR40C1D4R4BR2R4L2U4NL2R2BR2NR4
D2NR2D2BR6NR4U2NR2U2R4BR2BDRBD2L
RC3U4":SCREEN1,0:FORT=200TOST:DR
AW"BM"+STR$(T)+",13C1S4NU4":PLAY
"T255L255O3A":PLAY"T4L4"
670 NEXTT:IFS=1THENDRAW"C2S8BM73
,30NR4D4R4U2NL2D2BR2U4R4D4NL4BR2
NR4U4R4D4BR2RU4NLR2FD2GNL2BR7NU4
R4BR2NU4R4NU4BR2NR4U4R4BR2D4U2R2
NE2F2BR3UBUU2D3C1R":PLAY"O2L4T20
CP10DP10EP10P10CP10DP10EP10P10CP
10DP10EP10P10T2GG":FORT=1TO1000:
NEXTT
680 IFS=1 THEN LINE(73,30)-(200,
40),PRESET,BF
690 PO=0:KC=0:GOSUB1180:IF S=11T
HEN RETURN ELSETIMER=0
700 A=JOYSTK(0):B=JOYSTK(1):IFA>
10ANDA<53 AND B>10ANDB<53 AND PO
=0AND PEEK(65280)<>126 AND PEEK(
65280)<>256 THEN750
710 IF PEEK(65280)=254 OR PEEK(6
5280)=126 THEN780 ELSE 720
720 IFA<5 ANDX>7THENX=X-9:ST=ST-
.2:GOSUB1220:PUT(X+9,Y)-(X+20,Y+
15),BL,PSET:PUT(X,Y)-(X+11,Y+15)
,RL,PSET:PO=1:GOTO840
730 IFA<10 ANDX>2 THENX=X-4:PUT(
X+4,Y)-(X+15,Y+15),BL,PSET:PUT(X
,Y)-(X+11,Y+15),RL,PSET:PO=1:GOT
O840
740 IFA>10ANDB>10ANDA<53ANDB<53T
HENPUT(X,Y)-(X+11,Y+15),ST,PSET:
PO=0:GOTO840
750 IFA>58 AND X<233AND S<>4THEN
 X=X+9:ST=ST-.2:GOSUB1220:PUT(X-
10,Y)-(X+5,Y+15),BL,PSET:PUT(X,Y
)-(X+11,Y+15),RR,PSET:PO=2:GOTO8
40
760 IFA>53 ANDX<253-15THENX=X+4:
PUT(X-4,Y)-(X+11,Y+15),BL,PSET:P
UT(X,Y)-(X+11,Y+15),RR,PSET:PO=2
:GOTO840
770 GOTO810
780 IF A<10 OR A>53 THEN 790 ELS
EPUT(X,Y)-(X+11,Y+15),BL,PSET:PU
T(X,Y-15)-(X+11,Y),ST,PSET:ST=ST
-1:GOSUB1220:PLAY"T255O3;12;1":P
UT(X,Y-15)-(X+11,Y),BL,PSET:PUT(
X,Y)-(X+11,Y+15),ST,PSET:IFS=4 O
RS=9 THENST=ST+1:GOTO840 ELSEGOT
O840
790 IFA<10 THEN800ELSEIFX>217THE
N860 ELSEPUT(X,Y)-(X+11,Y+15),BL
,PSET:PUT(X+15,Y-15)-(X+26,Y),RR
,PSET:ST=ST-1:GOSUB1220:PLAY"T25
5O3;12;1":PUT(X+13,Y-15)-(X+24,Y
),BL,PSET:X=X+25:PUT(X,Y)-(X+11,
Y+15),RR,PSET:IFS=4 ORS=9 THENST
=ST+1:GOTO840ELSE840
800 IFX<29THEN 860 ELSEPUT(X,Y)-
(X+11,Y+15),BL,PSET:PUT(X-26,Y-1
5)-(X-15,Y),RL,PSET:ST=ST-1:GOSU
B1220:PLAY"T255O3;12;1":PUT(X-26
,Y-15)-(X-15,Y),BL,PSET:X=X-25:P
UT(X,Y)-(X+11,Y+15),RL,PSET:IFS=
4 OR S=9 THEN ST=ST+1:GOTO840 EL
SE840
810 IFB<10 AND PPOINT(X+5,Y-2)=3
 THEN PUT(X,Y)-(X+11,Y+15),BL,PS
ET:Y=Y-40:PUT(X,Y)-(X+11,Y+15),S
T,PSET:GOTO840
820 IFB>53 AND PPOINT(X+5,Y+19)=
3THEN PUT(X,Y)-(X+11,Y+15),BL,PS
ET:Y=Y+40:PUT(X,Y)-(X+11,Y+15),S
T,PSET:GOTO840
830 IFB>53 THEN PUT(X,Y)-(X+11,Y
+15),BL,PSET:PUT(X,Y)-(X+11,Y+15
),DU,PSET:PO=3:GOTO 840
840 IFST<243ANDRND(17+INT(L*1.5)
```

REVIEWED:
JAN 1989

REVIEWED
JAN 1989
RAINBOW
CERTIFICATION
SEAL

MJK & MJK3 DOS
WHY BUY ADOS 3
WHEN YOU CAN HAVE THIS!

New:		
	MJK DOS for COCO 1 & 2	$29.95
	MJK3 DOS for COCO 3	$39.95

MOST POWERFUL OPERATING SYSTEM FOR THE COCO EVER! Allows up to 3 DS-80 track drives or 35/40T drives.

********Standard Radio Shack* 35T format********

Wildcard DIR, COPY, & KILL in one run or one at a time upon user prompt. All the files can be displayed alphabetically, including the date that the file was saved. Use the powerful CHAIN command to use programs of any length. FULL SCREEN EDITOR & FULLY SPELLED OUT ERROR NAMES. Hit one key to repeat the last command.

40 NEW COMMANDS & FUNCTIONS: CHAIN, AUTO, DATE, CAT. WAIT RUNM, BAUD, FIND, OLD, DATE$. LCOPY, REPL, TYPE, SPLIT or JOIN basic lines. SAY for real spoken text, word peek & poke and many more . . .

ALLOWS YOU TO READ/WRITE/FORMAT 35/40 DISKS ON AN 80T DRIVE
******** EPROMABLE ****** **** FREE UPDATES FOR 1 YEAR ****

MJK512 DOS(COCO3-512K)	**$49.95**

BUILT IN RAM DISK & RAM TEST COMMANDS + 5 MORE

MONITOR-DISASSEMBLER (COCO 1, 2 & 3)	$29.95
SOURCE-CODE/LABEL GENERATOR (COCO 1, 2 & 3)	$39.95
JB REMOTE RS-232 PACK DRIVER FOR BBS etc. (COCO 1, 2 & 3)	$19.95
NEWKEY (COCO 3) NEW KEY SCAN — gives you true ALT & CTRL	$15.00
NEWKEY 232 (COCO 3) — JB REMOTE and NEWKEY in one package	$25.00
RTC — REAL TIME HARDWARE CLOCK for the COCO 1, 2 & 3	$35.00
ROM PACK — FOR RTC CLOCK	$15.00

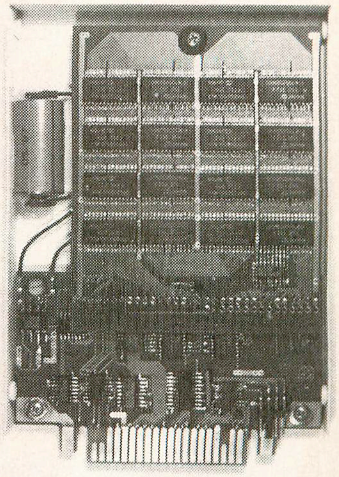
LIMITED TIME OFFER!
RETURN YOUR OLD ADOS OR ADOS3 DISK AND DOC'S AND GET $15.00 OFF YOUR MJK512 DOS. I GIVE YOU CREDIT FOR THEIR DOS. DO THEY DO THE SAME? (original disks & doc's only *no copies*)

CALL OR WRITE (COD ORDERS OK)

COCO CONNECTION OF PHILA, PA.
5003 B ST.
PHILA., PA. 19120-3929
PHONE= 215-457-1809 VOICE
BBS PHONE= 215-457-7478 (300/1200) (8,N,1)
COMPUSERVE ID= 72317,437 (LEAVE PHONE #)
DELPHI ID= COCOCONNECT

```
)=1 THEN DRAW"BM"+STR$(X+12)+","
+STR$(Y+15)+"C4NU6R2NU10R2U6":PL
AYM$(4):DRAW"C1D6L2NU10L2U6":ST=
ST+INT(7/S):FORT=200TOST:DRAW"BM
"+STR$(T)+",13NU4":NEXTT
850 IF S=4 ORS=9 THEN TI=TI-1:PS
ET(TI,24,1):IF TI<1 THEN TI=1
860 FOR T=1TO PN:IF(Y=PB(T)-15AN
D X=>PA(T)-3)AND(Y=PB(T)-15AND X
=<PA(T)+7)THEN 870 ELSE NEXTT:GO
TO890
870 TR=TR+1:DRAW"BM"+STR$(PA(T))
+","+STR$(PB(T))+"S2C1NR10H2NR14
H2NR18H2NR22U2NR22U2NR22U2NR22BE
2R18H2L14E2R10":DRAW"BM"+STR$(PA
(T))+","+STR$(PB(T)-2)+"S4C2U6BR
4D6R4U6NL4BR4D6R4U6L4":PLAYM$(1)
:PA(T)=0:PB(T)=0:SC=SC+100:DRAW"
C1R4D6L4U6L4NR4D6L4U6BL4D6"
880 GOSUB1180:GOTO700
890 IF Y+15=KB+6AND X=>KA-3AND Y
+15=KB+6 AND X<=KA+7THEN 900ELSE
910
900 KC=1:LINE(KA-2,KB)-(KA+12,KB
+6),PRESET,BF:DRAW"C2BM"+STR$(KA
)+","+STR$(KB)+"NR6F6NL6BR4U6R4D
6NL4":PLAYM$(1):DRAW"C1NR4U6L4D6
L4NL10H6R6":KA=0:KB=0:SC=SC+50:G
OSUB1180:DRAW"C2BM136,4R4D2G2H2N
U2F2D8NL2U2NL2":GOTO700
910 IFPPOINT(X+5,Y+19)=1 AND Y<1
60 THEN FORY=Y TO Y+40 STEP4:PUT
(X,Y-8)-(X+11,Y+7),BL,PSET:PUT(X
,Y)-(X+11,Y+15),ST,PSET:PLAY"T25
5O2C":NEXTY:PUT(X,Y-8)-(X+11,Y+7
),BL,PSET:Y=Y-4:PUT(X,Y)-(X+11,Y
+15),DU,PSET:FA=1:ST=ST-10:GOTO9
10
920 IF SC>3999 AND SC<4351 THEN
FG=1
930 A$=INKEY$:IF FG=1AND A$=" "T
HENPLAYM$(4):PLAYM$(1):FG=0 ELSE
GOTO950
940 FORT=1TO20:SCREEN1,1:PLAY"L2
55T255O3A":SCREEN1,0:NEXTT:RESTO
RE:FORT=1TO15:READLX,LY:NEXTT:S=
6:ST=250:PCLS1:FORT=1TO20:SCREEN
1,1:PLAY"A":SCREEN1,0:NEXTT:PLAY
"L4T4":GOTO240
950 IFFA=1 ANDPPOINT(X+5,Y+19)<>
1THEN FA=0:PLAY M$(2):GOSUB1220:
GOTO700
960 IFPPOINT(X+5,Y+19)=1 AND Y>1
60 THEN ST=200:FORT=Y TO200 STEP
4:PUT(X,T-4)-(X+11,T+11),BL,PSET
:PUT(X,T)-(X+11,T+15),ST,PSET:NE
XTT:PUT(X,T-4)-(X+11,T+11),BL,PS
ET:GOSUB1220:GOTO700
970 IFX=>LA ANDY=LB+1ANDX=<LA+11
ANDKC=1THENPLAYM$(4):SC=SC+350:G
OSUB1180:DRAW"S4":S=S+1:FORAA=1T
O500:NEXTAA:IFST<245THENST=ST+5:
GOTO240 ELSE240
980 IF(S=6ANDX>195ANDX<201AND Y=
124) OR(S=7ANDX>233ANDX<246AND Y
=84) OR(S=8ANDX>195ANDX<201AND Y
=124)THEN 990 ELSE 1000
990 FORT=Y+15 TO Y STEP-2:PUT(X,
Y)-(X+11,T),ST,PSET:PUT(RA,RB)-(
RA+11,RB+15),ST,PRESET:PUT(RA,RB
)-(RA+11,RB+15),ST,PSET:PLAY"L25
5T255O2A":NEXTT:LINE(X,Y)-(X+11,
Y+15),PRESET,BF:X=RA:Y=RB:PLAY"L
4T4"
1000 IFS<>WR OR WW=0THEN 1020 EL
SEIF RND(3)<>1 THEN 1020 ELSE R=
RND(4):RR=RND(115)+5:IFR=1 THEN
RA=L1 ELSEIFR=2 THEN RA=L2 ELSEI
FR=3 THEN RA=L3 ELSEIF R=4 THENR
A=L4 ELSE1000
1010 CIRCLE(RR,RA),5,1:PAINT(RR,
RA),1,1
1020 IF S=WR AND WW=1  AND FF=0
THEN FF=1:PUT(218,WY)-(229,WY+15
),RL,PSET:COLOR2:LINE(231,WY)-(2
31,WY+15),PSET:FX=210:FY=Y+9
1030 IF S=WR AND FF=1 THEN PUT(F
X,FY)-(FX+11,FY+5),BL,PSET:FX=FX
-8:IF FX<=12 THEN FF=0 ELSEPUT(F
X,FY)-(FX+11,FY+5),FB,PSET
1040 IF S=WR AND FF=1 AND Y=FY-9
 AND X>=FX-4 AND X+11<=FX+15 THE
N PLAY"T255L255O1FGT4L4":ST=ST-1
2:GOSUB1220:PUT(FX,FY)-(FX+11,FY
+5),BL,PSET:FF=0
1050 IF S=WR AND WW=1 AND RND(6)
=1 THEN ST=ST-RND(3):SCREEN1,1:P
LAY"O5T255L255GL4T4":SCREEN1,0:G
OSUB1220
1060 IFWW=1 AND S=WR THEN PUT(21
8,WY)-(229,WY+15),BL,PSET:LINE(2
16,WY)-(216,WY+15),PRESET:LINE(2
31,WY)-(231,WY+15),PRESET
1070 IFWW=1 AND S=WR THEN PUT(21
8,Y)-(229,Y+15),ST,PSET:COLOR2:L
INE(216,Y)-(216,Y+15),PSET:WY=Y
1080 IFS<>WR ORY<>164THEN1100 EL
SEIFX>53 ANDX=<74 THEN1090 ELSE
IFX>=30 ANDX<=45 THEN1090 ELSE I
FX=>84 ANDX=<100 THEN1090 ELSE 1
100
1090 ST=200:FORT=1TO15:PUT(X,Y)-
(X+11,Y+15),ST,PRESET:PLAY"L255T
255O4D":PUT(X,Y)-(X+11,Y+15),RL,
PRESET:PLAY"E":PUT(X,Y)-(X+11,Y+
15),RR,PRESET:PLAY"F":PUT(X,Y)-(
X+11,Y+15),BL,PSET:NEXTT:PLAY"T4
L4":GOSUB1220
1100 IFY=164 ANDWW=1 AND S=WR TH
EN 1110 ELSE1130
1110 FORT=1TO7:PUT(218,Y)-(229,Y
+15),BL,PSET:PUT(66,Y)-(77,Y+15)
```

```
,ST,PRESET:PUT(66,Y)-(77,Y+15),B
L,PSET:PLAY"L255T255O2A":NEXTT:P
LAY"L4T4":FORT=1TO15:PUT(66,Y)-(
77,Y+15),ST,PRESET:PUT(66,Y)-(77
,Y+15),RL,PRESET:PUT(66,Y)-(77,Y
+15),RR,PRESET
1120 PUT(66,Y)-(77,Y+15),BL,PSET
:PLAY"L255T255O4DEF":NEXTT:WW=0:
PLAY"L4T4":COLOR4:LINE(132,63)-(
195,61),PSET,B:LINE(132,103)-(19
5,101),PSET,B:LINE(132,143)-(195
,141),PSET,B:LINE(216,Y)-(216,Y+
15),PRESET
1130 TM=4100-S*85:IFTIMER>TM AND
WW=1 ANDS<>4 AND S<>9 THENGOSUB1
290
1140 IFBN=0THEN700 ELSEFOR T=1 T
OBN:IF X<BX(T)+13 AND X+13>BX(T)
 AND PO<>3 AND Y=BY(T) THEN ST=S
T-5:PLAY"T255O4A":GOSUB1220:NEXT
T:GOTO1150 ELSE NEXTT:GOTO1150
1150 FORT=1TO BN:IFBD(T)=1THENBX
(T)=BX(T)+4:PUT(BX(T)-4,BY(T))-(
BX(T)+7,BY(T)+6),BL,PSET:GOTO116
0ELSE BX(T)=BX(T)-4:PUT(BX(T)+11
,BY(T))-(BX(T)+26,BY(T)+6),BL,PS
ET
1160 PUT(BX(T),BY(T))-(BX(T)+11,
BY(T)+6),BA,PSET:IFBD(T)=0 THEN1
170 ELSEIFPPOINT(BX(T)+13,BY(T)+
6)<>1 ORBX(T)>=242 THENBD(T)=0:P
UT(BX(T),BY(T))-(BX(T)+11,BY(T)+
6),BL,PSET:BX(T)=BX(T)-11:NEXTT:
GOTO700ELSENEXTT:GOTO700
1170 IF PPOINT(BX(T)-2,BY(T)+6)<
>1 OR BX(T)<=5 THEN BD(T)=1:PUT(
BX(T),BY(T))-(BX(T)+11,BY(T)+6),
BL,PSET:BX(T)=BX(T)+11:NEXTT:GOT
O700 ELSENEXTT:GOTO700
1180 SC$=STR$(SC):TT=LEN(SC$):CO
LOR3:LINE(70,3)-(130,17),PSET,BF
:DRAW"S8BM70,6C1":FORT=1TOTT:C$=
MID$(SC$,T,1)
1190 IFC$="0"THENDRAW"R4D4L4NU4B
E4BR2"ELSEIFC$="1"THENDRAW"BR2D4
BR4BU4"ELSEIFC$="2"THENDRAW"R4D2
L4D2R4BU4BR2"ELSEIFC$="3"THENDRA
W"R4D2NL2D2NL4BU4BR2"ELSEIFC$="4
"THENDRAW"D2R3NU2NRD2BR3BU4"ELSE
IFC$="5"THENDRAW"NR4D2R4D2NL4BU4
BR2"
1200 IFC$="6"THENDRAW"NR4D4R4U2N
L4BU2BR2"ELSEIFC$="7"THENDRAW"R4
G2D2BR4BU4"ELSEIFC$="8"THENDRAW"
R4D4L4U2NU2R4U2BR2"ELSEIFC$="9"T
HENDRAW"R4D4NL4U2L4U2BR6"
1210 NEXTT:DRAW"S4":RETURN
1220 COLOR3:IFST<200 THEN ST=200
1230 LINE(250,2)-(ST,16),PSET,BF
:IF ST=200 THEN 1240 ELSE RETURN
1240 PUT(X,Y)-(X+11,Y+15),BL,PSE
T:DRAW"C2BM"+STR$(X)+","+STR$(Y-
4)+"BR6D2NR2NL2D6R6NR2NU2ND2L12N
L2NU2ND2R6D10NL2NR2":PLAYM$(3)
1250 DRAW"S8BM75,30NR4D4R4U2L2BU
2BR4BR2G2D2U2R4NH2D2BR2U4F2E2D4B
R2NR4U2NR2U2R4BR6ND4R4D4NL4BR2BR
2H2NU2F2E2U2BR2NR4D2NR2D2R4BR2U4
R4D2L4R2F2":A$=INKEY$:IFA$=""THE
N1260 ELSESCREEN0,0:PMODE1,1:PCL
S:RESTORE:GOTO230
1260 DRAW"S8C2BM53,70NR4D4U2R4U2
BR2NR4D4U2R4NU2L2F2BR2NR4U2NR2U2
R4BR2NR4D2R4D2NL4BR2R4U2L4U2R4BR
6BD2ND2NR4E2F2D2BR2U4F4U4BR2F2NE
2D2BR10U4D2R2NE2F2BR2NR4U2NR2U2R
4BR2F2NE2D2":A$=INKEY$:IFA$=""TH
EN1270ELSESCREEN0,0:PMODE1,1:PCL
S:RESTORE:GOTO230
1270 DRAW"S8C2BM55,110R4L2D4BR4U
4R4D4NL4BR6U4R4D2NL4U2BR2D4R4BR2
BU4BD2ND2NR4E2F2D2BR4U2NH2E2BR6B
D2ND2NR4E2F2D2BR2R4U2NL2D2L4U4R4
BR2BD2ND2NR4E2F2D2BR2R4L2U4NL2R2
BR2ND4F4U4":A$=INKEY$:IFA$=""THE
NDRAW"C"+STR$(RND(3)+1):GOTO1250
1280 SCREEN0,0:PMODE1,1:PCLS:RES
TORE:GOTO230
1290 ST=ST-2:GOSUB1220:PLAY"T255
L255O3GL4T4":RETURN
```



SolidDrive™ More than a Ramdisk!

SolidDrive™ doesn't forget! Built in battery power kicks in when you turn off your CoCo to keep all your files safe and ready for use instantly the next time you power-up. Unlike dynamic ramdisks that require lots of power and constant refreshing, our CMos static rams consume so little power that SolidDrive™ will retain it's information for years. No more floppy to ramdisk file copying just to get ready to work. If power failures are your problem SolidDrive™ is for you! The instant power loss occurs your valuable work is protected. SolidDrive™ works with OS9®, RSDos or can be accessed from machine language programs. You can even use part of SolidDrive™ from OS9 and part from RSDos. No matter how you use SolidDrive™ we think you'll be amazed at how fast it works. There simply isn't any faster long term storage device available for the CoCo. SolidDrive™ is compatible with Multi-Pak®, or may be used with a "Y" cable and comes complete with OS9® Level I/II device driver and formatter software. Available in 512K and 1 Megabyte versions. Factory upgrades available for 512K version. Also available RSDos Driver treats SolidDrive™ as 3 or 6 SSSD RS devices, 27C64 EProm $19.00 Includes software to partition SolidDrive for use by OS9® and RSDos, and SolidBoot© software to allow auto boot direct to OS9®

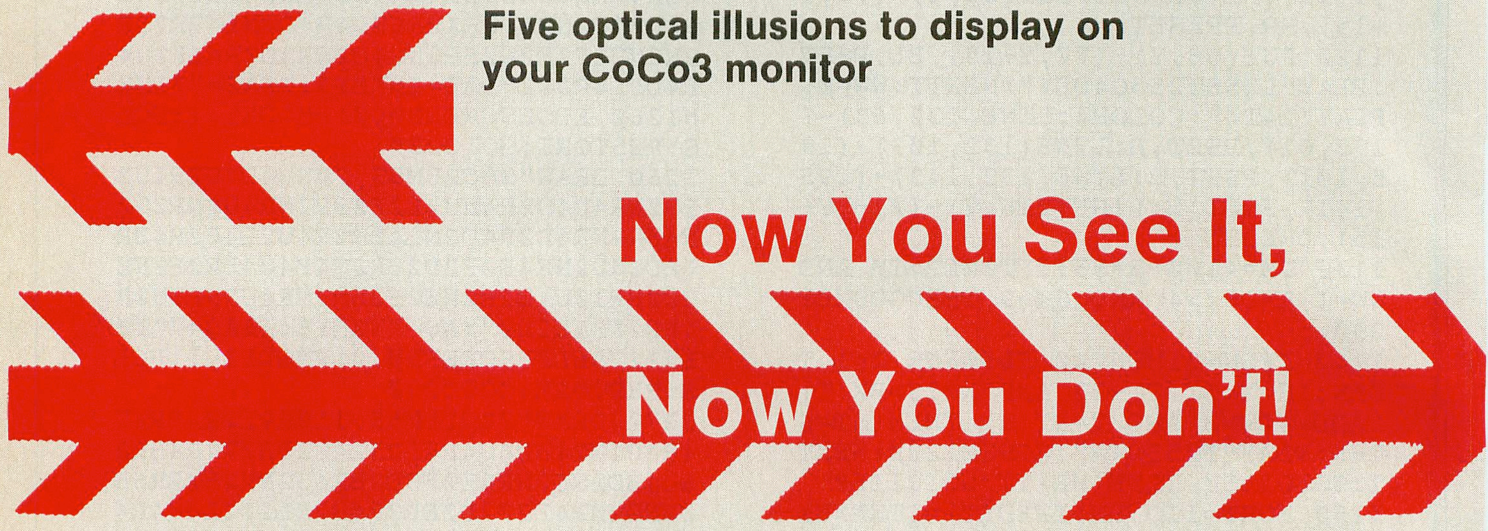
SolidDrive™ by Vidicom Corp
512K (524,288 bytes) $395.00
1 Meg (1,048,576 bytes) $695.00
Please add $4.00 shipping
Arizona Residents add 5.5% Sales tax
Visa MasterCard orders welcome

SolidDrive™ is the fastest, most reliable long-term storage available to the small computer user!

2 Year Limited Guarantee

Vidicom Corp 20 E. Main St. ¤ Suite 710
Mesa, AZ 85201 (602) 827-0107
Hours M-F 9:00 am - 5:00 pm MST

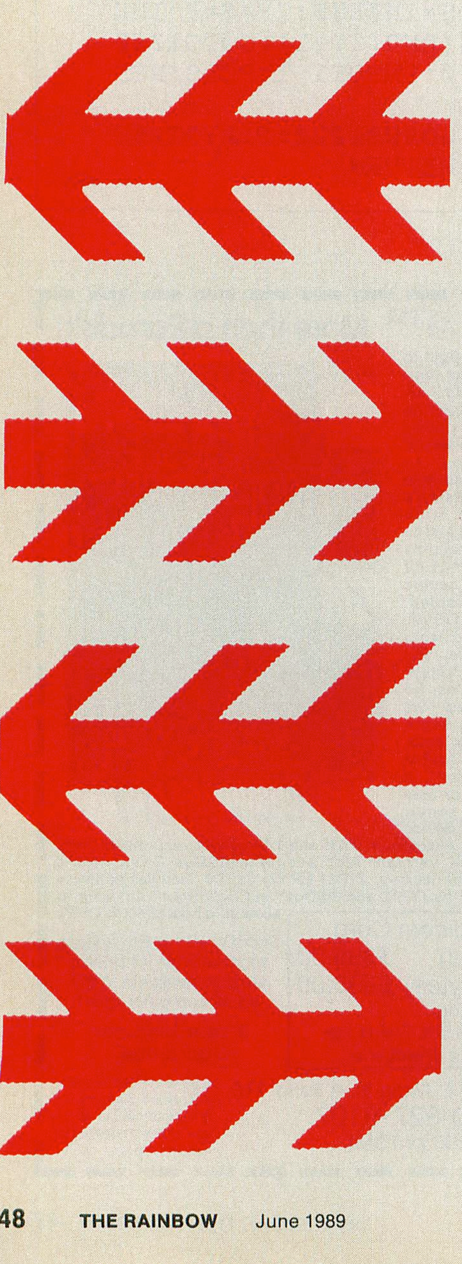
OS9 is the trademark of Microware Systems Inc and Motorola Inc. Multi-pak is the trademark of Tandy Corp.



Five optical illusions to display on your CoCo3 monitor

Now You See It, Now You Don't!

By Jean-Francois Morin



After reading an article about optical illusions, I decided to try to draw some examples of them on my computer. I first drew the CoCo 3 screen on a sheet of ruled paper, and then I traced the illusions on that "screen." After drawing the pictures, I built them into one program. I have written some explanations in the program to make some illusions easier to understand.

The first illusion is a paradoxical picture with three branches at the left end and two at the right end. Try to see where the middle branch disappears.

In the second illusion, there are 16 black squares on a large white square. Watch the picture carefully and you should see gray dots at the white intersections between the black squares.

The third illusion contains two identical circles that are surrounded by smaller and larger circles. If you look carefully at the two center circles, the left one should appear smaller than the right one.

The fourth illusion is another paradoxical picture. It is a 3-D triangle that is impossible to build with wood or metal.

The last illusion is made of horizontal, vertical and diagonal lines that don't seem to be parallel at all, but they are!

For the "Press a key" that appears on each screen, I used the `HPRINT` command. The `POKE 59078, 33` command disables the automatic `HCLS` with the `HSCREEN` command (`POKE 59078, 141` to put it back). To copy 40-column text on the 640-by-192 screen, I used the `POKE 59063, 33` and `POKE 59063, 141` that appear in "Our Highfalutin' Feline Does a CoCo 3 Fandango" by H. Allen Curtis (May '87, Page 52).

Jean-Francois Morin is a 16-year-old beginning programmer who also enjoys swimming, reading books and biking. He uses his CoCo 3 for playing games, word processing, and making music and graphics.

(Questions or comments concerning this program may be addressed to the author at 16 Parc des Cormiers, Loretteville, Quebec, Canada G2A 3R7. Please enclose an SASE if requesting a reply.) ☐

7 73
22 176
11 227
END 158
18 85

The listing: ILLUSION

```
0 'COPYRIGHT 1989  FALSOFT,INC
1 POKE65497,0:ONBRKGOTO30:PALETT
E0,0:PALETTE1,63:PALETTE2,0:PALE
TTE3,16:PALETTE4,32:PALETTE5,63:
POKE59078,33
2 HSCREEN2:HCLS:HPRINT(15,10),"I
llusions":HPRINT(9,13),"by Jean-
Francois Morin":FORI=0TO64STEP8:
HLINE(I,I)-(320-I,192-I),PSET,B:
NEXT
3 Z=1:FORI=4TO28STEP8:HPAINT(I,I
),I/4+Z,1:HPAINT(I+32,I+32),I/4+
Z,1:Z=Z-1:NEXT:FORI=0TO64STEP8:H
LINE(I,I)-(320-I,192-I),PRESET,B
:NEXT:HLINE(104,184)-(207,191),P
RESET,BF:HPRINT(14,23),"Press a
key
4 IFINKEY$=""THENP=RND(16)-1:GOS
UB28:GOTO4
5 HSCREEN0:WIDTH40:PALETTE3,16:C
LS4:ATTR3,3:LOCATE8,6:PRINT"The
first illusion is a":LOCATE8,7:P
RINT"paradoxical picture. At":LO
CATE8,8:PRINT"the left end, ther
e are":LOCATE8,9:PRINT"three bra
nches, but one":LOCATE8,10:PRINT
"disappears at the right
6 LOCATE8,11:PRINT"end.":GOSUB29
7 HSCREEN4:HCLS:FORI=100TO101:FO
RJ=56TO57:HDRAW"BM=I;,=J;R440M+2
0,+50M-10,+15L450BU15NR460BU10R4
30NM-10,-25L20M-6,-15NM+14,-10L4
04BU10R420":NEXTJ,I
8 FORI=63TO123STEP25:FORJ=100TO1
01:FORK=I TOI+1:HCIRCLE(J,K),15:
NEXTK,J,I:POKE59063,33:HSCREEN2:
HPRINT(14,22),"Press a key":HSCR
EEN4:POKE59063,141:EXEC44539
9 HSCREEN0:CLS:LOCATE7,6:PRINT"O
n the next illusion, the":LOCATE
```

FOR YOUR
COCO 1,2,3
E.Z.FRIENDLY

EZWRITER (CoCo 2,3) Our #1 best-seller! Makes letter writing simple, fast, & EASY. Automatically sets everything for you. Does multiple copies from mailing lists and even labels. Works on all printers! Completely idiot-proof! Disk..............Still only $19.95

NEW *LEONARDO'S PAINTBOX* (CoCo 3) Use a joystick to write GREAT graphics programs! Create complex 16 color graphics; then SAVE as BASIC routines which use HDRAW, HPAINT, HSET commands! RUN alone or MERGE. See review in March '89 RAINBOW. Self-centering joystick req. Spec'l Intro price! Disk.$26.95

SUPER GRAPHICS-16 (CoCo 1,2,3) A budget graphics program with lots of features! Draw, paint, make boxes, lines, get-put, undo, magnify, shrink-stretch, write text. Needs only 16K ECB! DMP-105/ 106. Review in June '88 RAINBOW. A bargain. Disk.....$16

MATH GAMES (CoCo 1,2,3) FOUR great educational programs on 1 disk! For grades 2 - 8. Covers addition, subtraction, multiplication, and division. Different levels. Exciting animated graphics and sounds. RAINBOW review Sept '88. Disk............Only $19.95

KEYBOARD COMMANDER (CoCo 2,3)This space ship typing game is a fun way to learn the keyboard. Teaches all the positions of the fingers and the reaches. Reviewed Nov '88 RAINBOW and also Jan '89 CoCo Clipboard Magazine. Disk.....Only $24.95

TEDDY BEARS (CoCo 2,3) Delightful educational program with 2 cute, dancing bears for grades 1-3. Child uses only joystick, mouse, or keys to point to bear who holds the correct answer. Teacher/parent inputs quizzes. RAINBOW review Sept'88. Disk... $19.95

NEW *C.A.R.* "Computerized Auto Record" (CoCo 1,2,3) Keeps a complete record of all your car maintenance. For any number of vehicles. Reminds you when to service. Print-out can be valuable for tax purposes, insurance claims, selling or trading. Disk........$9.95

E.Z.FRIENDLY SOFTWARE
118 Corlies Ave., Poughkeepsie NY 12601 telephone: (914) 485-8150
PLEASE ADD $1.50 S/H FOR ORDERS UNDER $50
NEW YORK RESIDENTS INCLUDE SALES TAX
Send for your free catalog!

MAGI

MAGI MAGUS Adventure Game Interpretor - Only $22.50 US

ALL NEW CONCEPT IN ADVENTURE GAMING!

PLAY OVER THE MODEM (or use a terminal) for TWO-PLAYER action! - or play two characters on the same screen!
MODULAR - the game actually GROWS as you add new modules!
REPLAYABLE - every time is different!

Comes complete with game module 1.

Play the hero or play the villain in this contest of might and mind! Can you discover Dr. Djinn's deadly secret in time? Will your super (or not so super) powers save the day? Why are you wearing this stupid-looking costume anyway? Answer all these questions and more when you play:

The Legacy of Dr. Djinn (SUPERHEROES series)

4MOST Four POWERPACKED OS9 programs! - Only $24.95 US

Includes all new SHELL with built-in wildcard processing and paramater passing to procedure files!

6PAK Six GREAT OS9 utilities! - Only $12.95 US

WHERE, CALC and FOUR MORE!

See our May advertisment for more on 4MOST and 6PAK!

Send cheque or money order payable to:

MAGUS SYSTEMS ENGINEERING
33A Woodvale Green,
Nepean, Ontario, CANADA
K2G 4H3

Please add $2 US to total order for shipping.

```
7,7:PRINT"intersections between
the":LOCATE7,8:PRINT"black squar
es  seem to be":LOCATE7,9:PRINT"
grey,  but  they are only":LOCAT
E7,10:PRINT"in your mind!":GOSUB
29:HSCREEN4
10 HCLS:FORI=180TO479STEP80:FORJ
=20TO169STEP40:HLINE(I,J)-(I+73,
J+38),PSET,B:NEXTJ,I:HLINE(160,1
0)-(519,191),PSET,B:HPAINT(170,1
5):POKE59063,63:HSCREEN2:A$="Pre
ss a key":FORI=6TO16:HPRINT(5,I)
,MID$(A$,I-5,1):NEXT:HSCREEN4:PO
KE59063,141:EXEC44539
11 HSCREEN0:CLS:LOCATE9,6:PRINT"
On the third illusion,":LOCATE9,
7:PRINT"there  are two identi-":
LOCATE9,8:PRINT"cal circles surr
ounded":LOCATE9,9:PRINT"by  smal
ler and larger":LOCATE9,10:PRINT
"circles,  but the left":LOCATE9
,11
12 PRINT"circle  looks  smaller"
:LOCATE9,12:PRINT"than the right
 one.":GOSUB29
13 HSCREEN4:HCLS:FORI=1TO14:READ
A,B,C:HCIRCLE(A,B),C:HPAINT(A,B)
:NEXT:POKE59063,63:HSCREEN2:HPRI
NT(14,22),"Press a key":HSCREEN4
:POKE59063,141:EXEC44539
14 DATA200,96,13,200,66,25,140,8
1,25,140,111,25,200,126,25,260,1
11,25,260,81,25,460,96,13,460,81
,8,430,89,8,430,103,8,460,111,8,
490,103,8,490,89,8
15 HSCREEN0:CLS:LOCATE8,6:PRINT"
On the fourth illusion,":LOCATE8
,7:PRINT"you  will  see  another
":LOCATE8,8:PRINT"paradoxical pi
cture. It":LOCATE8,9:PRINT"is a
3-D triangle  that":LOCATE8,10
16 PRINT"appears  easier  to  be
":LOCATE8,11:PRINT"drawn  on a s
creen than":LOCATE8,12:PRINT"bei
ng built  with solid":LOCATE8,13
:PRINT"wood!":GOSUB29
17 HSCREEN4:HCLS:HDRAW"BM32,152M
288,24R48M600,156M576,168L512M32
,152R48NM112,168R464NM568,140NM5
76,168M312,36NL48NM336,24M112,13
6NM80,152R352NM496,152M312,60NM3
36,48M160,136
18 PALETTE2,32:HPAINT(316,32),2,
1:HPAINT(288,40),2,1:HPAINT(96,1
50),2,1:HPAINT(336,32),3,1:HPAIN
T(568,150),3,1:HPAINT(320,48),3,
1:POKE59063,33:HSCREEN2:HPRINT(1
4,23),"Press a key":HSCREEN4:POK
E59063,141:EXEC44539
19 HSCREEN0:CLS:LOCATE8,6:PRINT"
On  the  last illusion,":LOCATE8
,7:PRINT"there  are  horizontal,
":LOCATE8,8:PRINT"vertical  and
 diagonal":LOCATE8,9:PRINT"lines
. They do not seem":LOCATE8,10:P
RINT"to be  parallel  at all":LO
CATE8,11
20 PRINT"but they are!":GOSUB29
21 HSCREEN4:HCLS:C$="M+16,-8":A$
="XC$;U16XC$;D16":B$="XC$;L32XC$
;R32":HDRAW"BM0,40XA$;XC$;U16R16
D8XC$;BM0,56XC$;D16XA$;XA$;XA$;X
C$;U8BM0,168":FORI=1TO9:HDRAWA$:
NEXT:HDRAW"XC$;U16R16D8XC$;BM0,1
84XC$;D16":FORI=1TO11:HDRAWA$:NE
XT:HDRAW"XC$;U8
22 HDRAW"BM176,191XC$;D8BR16U16X
C$;D16":FORI=1TO10:HDRAWA$:NEXT:
HDRAW"XC$;U16BR16D8XC$;BM256,191
U8XC$;D16":FORI=1TO11:HDRAWA$:NE
XT:HDRAW"XC$;BM432,191XC$;D8BR16
U16XC$;D16":FORI=1TO5:HDRAWA$:NE
XT:HDRAW"BM512,191U8XC$;D16XA$;X
A$;XA$;XC$;
23 HDRAW"BM0,96R16":FORI=1TO6:HD
RAWB$:NEXT:HDRAW"BM0,136XC$;L16U
8R32":FORI=1TO7:HDRAWB$:NEXT:HDR
AW"XC$;BM80,191":FORI=1TO12:HDRA
WB$:NEXT:HDRAW"BM112,191XC$;R32"
:FORI=1TO11:HDRAWB$:NEXT:HDRAW"X
C$;BM336,191
24 FORI=1TO10:HDRAWB$:NEXT:HDRAW
"BM368,191XC$;R32":FORI=1TO7:HDR
AWB$:NEXT:HDRAW"U8L16XC$;BM592,1
91XB$;XB$;BM624,191XC$;
25 FORI=1TO16:READA,B:HPAINT(A,B
):NEXT:DATA96,4,120,4,224,4,4,13
2,352,4,380,4,480,4,608,4,188,18
8,636,4,636,48,636,36,636,112,44
4,188,636,176,636,164
26 HLINE(160,184)-(480,191),PRES
ET,BF:POKE59063,33:HSCREEN2:HPRI
NT(11,23),"Press BREAK to end":H
SCREEN4:POKE59063,141
27 GOTO27
28 FORI=1TO500:NEXT:FORI=0TO3:PA
LETTEI+2,P+I*16:NEXT:RETURN
29 LOCATE13,22:ATTR3,3,B:PRINT"P
ress a key...";:ATTR3,3:LOCATE39
,23:EXEC41329:RETURN
30 HSCREEN0:POKE65496,0:CLS:CMP:
PALETTE3,16:POKE59078,141
```

LOOK AT THESE POWERFUL M.L. PROGRAMS FOR BASIC USERS !

INTRODUCING THE AMAZING:

"BIG BASIC"

COCO3 USERS CAN EXPERIENCE NEW OPPORTUNITY & FULL POWER!

Now you can access up to 472K of memory in a 512K CoCo or up to 92K in a 128K machine with any mix of programs and/or data.

Magically fast executes up to 58 basic programs in 58 windows simultaneously or fast executes one massive program or database in two windows. Saves programs or variables with their currently running parameters and loads back that way as if you never left the program.

Chain in unlimited sized programs or data from disk(s) without erasing existing programming or variables.

- Modifies your basic operating system in some 70 locations but does not occupy user memory.
- Programs can be saved over multiple disks or use our BIG DISK Utility. (See below)
- Provides for variable exchange between windows.
- Uses 3 new simple basic words to create the power.
- Has excellent Demo program and Manual.
- Does not support cassette use.
- ONLY $39.95 U.S. or $47.95 CAN. plus $2.50 shipping & handling. Ontario residents add 8% PST.

For any CoCo (at least 64K) with 1.1 or 2.1 Disk Extended Basic:

"UTILITIES PACKAGE"

6 HANDY M.L. RESIDENT UTILITIES FOR BASIC USERS !

"BIG DISK"	• Standard double-sided drives converted to 360K in drive0 !
"DOUBLE40"	• Sets drives for 40 tracks each side.
"CONVERT/DISK"	• Formats 40 tracks on each side of a disk without disturbing the first 35. Instantly doubles all your present storage.
"QUIKDRIV/6MS"	• Sets fast drive stepping rate.
"QUIKDRIV/30M	• Fast drive shut off.
"SET FEED"	• Sets line spacing for printouts.

Only $17.95 U.S. $21.50 CDN.
Plus $2.50 Shipping.
Ont. Residents add 8% PST.

"MEMORY MASTER"

OUR FAVORITE PROGRAMMING TOOL

Scan, Edit, Copy, Printout any memory in your computer or on disk. Fix disks.

Fast entry of M.L. Listings.

Dual Windows ! Run two Basic Programs at once !
Chain in large running programs and variables from disk without restarting the existing program in the computer.
Includes Demo Program and Manual.

Only $24.95 U.S. $29.70 CDN.
Plus $2.50 Shipping.

Ont. Residents add 8% PST.

DANOSOFT
Box 124, Station "A"
Mississauga, Ontario L5A 2Z7

Package price all three programms;
$68.00 U.S.
$81.50 CDN.
Plus $2.50 For Shipping

Phone: (416) 897-0121
Office hours Eastern time.
Ont. Residents add 8% PST.

VISA
MasterCard

32K ECB

Put a new twist in computer graphics

CoCo in 3-D!

By Eugene Vasconi

We're about to change the definition of 3-D graphics on the Color Computer. Sure, any old computer can create simulated solid geometric images on the screen, but ours can actually make shapes appear to move in front of the screen!

The 3-D process was devised by filmmakers in their search for new ways to create realism in films and also as an audience-attracting gimmick. Most of us have probably sat either in a theatre or at home with 3-D glasses on and seen things appear to jump out at us from the screen. The sensation is quite simple to explain. Your eyes are two to three inches apart, and each sees a slightly different image from the other. The brain combines these images and, depending on how close the object is to your eyes, determines distance. 3-D takes advantage of this difference in creating the illusion of depth in two-dimensional pictures.

The left lens in 3-D glasses is a red filter. When the eye behind this filter sees something red, it emphasizes that object while putting less importance on other colors. The right, blue lens does the same thing with blue objects. (TV 3-D uses red and blue lenses, whereas theatre movies use red and green.) So we end up with colored images that, when combined in the brain, tend to put a depth perspective on the screen if done properly.

The 3-D processes on film and for the Color Computer are a bit different. Film tends to make colors melt into one another, while the computer makes them much more definite. This results in the need to make adjustments, and I've discovered some hints to use in creating your own pictures:

- Red objects appear in the background, while blue ones appear in the foreground.
- Green and white, universal to both eyes, aren't dimensional, but green *is* a good color to use to attract the eye to a certain part of the screen.
- Designs must be very bold and should have some movement.

This program is the result of my numerous experiments with 3-D. It is menu-driven and self-explanatory. When you load and run the program, it will execute a `PCLEAR 8` and give you a menu screen — I would suggest doing the test screen first to adjust your TV or monitor to the proper shades of color. Any automatic color controls will need to be switched off and the tint or hue control adjusted. Try to match the red and blue on the screen to the colors on a pair of 3-D glasses — too far off and you won't get the desired effect. Pressing M in any part of the program returns you to the menu.

One of the best examples of the program's use is to employ it in an adjustment of Norm Cutter's *Sinelines* program (October '83, Page 80). I've added both red and blue color to the line so that when it moves and turns, it creates various colored patterns. You'll also note a green line shown. This doesn't stay but is there to attract the eye to the main line. As the lines are drawn, you'll see the perspective shift as it seems to also move forward and backward.

Now find a pair of 3-D glasses — the show is about to start!

(Questions or comments concerning this program may be directed to the author at 12474 Starcrest 204, San Antonio, TX 78216. Please enclose an SASE when requesting a reply.) ☐

Eugene Vasconi is a helicopter pilot in San Antonio, Texas, as well as a musician and free-lance television producer. His major interests on the CoCo are graphics and music.

14	206	150	30
28	147	175	208
55	24	196	189
75	201	212	12
99	10	END	39
125	187		

The listing: `3DGRAPHX`

```
0 'COPYRIGHT 1989  FALSOFT,INC
1 GOTO 224
2 W=0:CLS(3):PRINT@39,"*** 3-D M
ENU ***";
3 PLAY"V25"
4 FORSX=1TO20:PLAY"V-O4L255T255C
E-G":NEXTSX
5 PLAY"V15"
6 PRINT@131,"1 - TEST SCREEN
      ";:PRINT@163,"2 - FOREGROU
ND CIRCLE     ";:PRINT@195,"3 - J
UMPING CIRCLE       ";:PRINT@227
,"4 - ATOM SMASHER          ";
7 PRINT@259,"5 - YELLING FACE
      ";:PRINT@291,"6 - STARBURS
T                ";:PRINT@323,"7 - D
IMENSIONAL SINELINES";:PRINT@355
,"8 - DO IT YOURSELF        ";
8 PRINT@417,">>PRESS NUMBER FOR
SELECTION<<";:PRINT@450,"**RETUR
N TO MENU WITH [M]**";:PRINT@480
,CHR$(143+32);
9 W$=INKEY$
10 W=VAL(W$)
11 IF W=>1 AND W=<8 THEN GOTO13
12 GOTO9
13 FORWN=1TO20:CLS(7):PRINT@198,
"PUT ON 3-D GLASSES";:PRINT@301,
"now";:PLAY"T255L255O4FF#G":FORP
P=1TO100:NEXTPP
14 CLS(8):PLAY"O1DD#E":FORPP=1TO
50:NEXTPP,WN
15 ON W GOTO16,28,50,73,94,138,1
85,202
16 CLS(4):PRINT @38,"3-D- TEST S
CREEN";:PRINT@130,"ADJUST THE FO
LLOWING SCREEN     TO MATCH THE
COLORS OF YOUR     3-D GLASSES.
THE RIGHT BLUE     SQUARE SHOULD
 APPEAR TO BE IN   FRONT OF THE
RED BACKGROUND --  OPPOSITE ON T
HE LEFT SIDE."
17 PRINT@384,"PRESS ANY KEY WHEN
 READY          >[M] RETURNS YOU T
O THE MENU"
18 '**TEST SCREEN***
19 PMODE3,1:PCLS(3)
20 COLOR5:LINE(125,0)-(125,196),
PSET
21 PAINT(200,10),4,5
22 COLOR4:LINE(30,50)-(125,120),
PSET,BF
23 COLOR3:LINE-(220,50),PSET,BF
24 EXEC44539
25 W$=INKEY$:IF W$="M" THEN GOTO
2
26 PMODE3,1:SCREEN1,1:GOTO25
27 '**CIRCLE & LINES***
28 PMODE3,1:PCLS(5):SCREEN1,1
29 FORX=10TO250STEP5
30 COLOR3
31 LINE(125,10)-(X,30),PSET
32 COLOR4
33 LINE-(X,170),PSET
34 COLOR3
35 LINE-(125,10),PSET
36 NEXTX
37 CIRCLE(125,100),71,2
38 PLAY"O2L255T255CAFDFAG"
39 CIRCLE(125,100),70,2:PAINT(12
5,100),3,2
40 FORX=1TO60STEP8:CIRCLE(125,10
0),X,4:SOUND X,1:NEXTX
41 DRAW"BM70,70;S6C5;R25D15L10D5
```

The Pak is Back again
and it's better than ever.

INTRODUCING....
TELEPAK II
The truly compatible RS232 pack.

Telecommunicating has become painless with our latest version of an old favorite.

INCLUDING:
- GOLD Connectors.
- The latest in microchip technology.
- Includes a 3 foot DB-25 cable.
- Does NOT require a multipack interface.
- Still compatible with your favorite software.

still only..
$49.95

2400 baud modem.... $149.95
Hayes compatible • includes cable (Either Coco or RS232)

Cables for your Coco needs
DB25 M-M $9.95
4 pin - DB25 . $9.95
(Specify Modem or printer)
Magnavox RGB. .$14.95
call for special cable needs

CoCo Software
Autoterm.........$39.95
The Wiz.........$49.95
X-term.........$49.95
Warp One.........$29.95
OS-9 L II BBS....$29.95

New from GIMMESOFT!..........V-term.........$39.95
CoCo III DOS enhancement! - UPDOS - $24.95
The latest from SDI Enterprises
VIP WRITER $79.95
Vip DATABASE III.. $69.95
VIP III Library... $179.95
Vip CALC III...... $ 69.95
COMING SOON... CLASSIFIED

Orion Technologies
P.O. Box 63196
Wichita, Ks. 67203

All orders add 3.00 shpg/hdlg.
C.O.D. additional 3.00
No delay for personal checks
(316) 946-0440

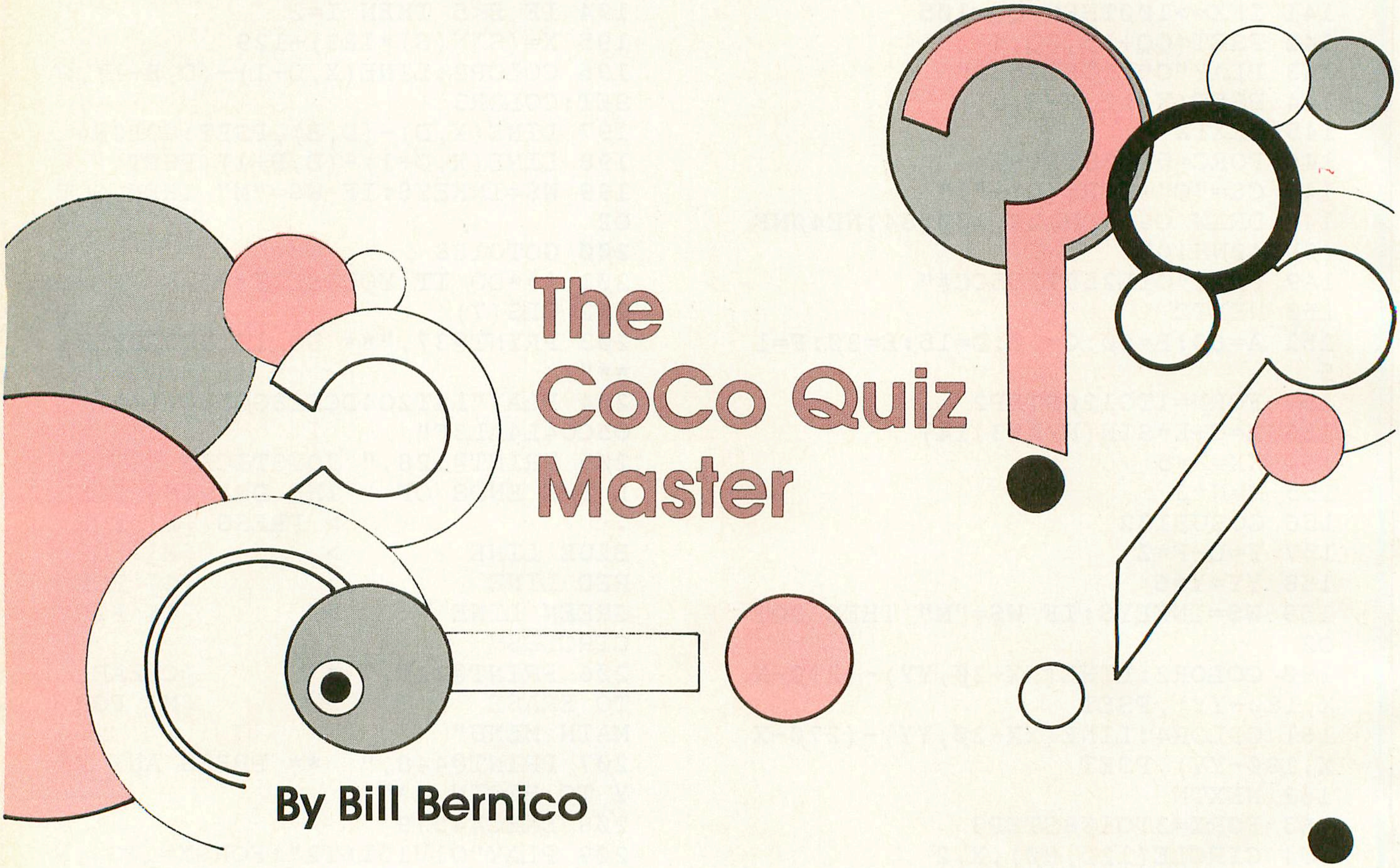
```
R10D15L25U7R10U4L6U13R6U4L10U7"
42 PAINT(75,75),4,5
43 DRAW"BM137,71;S5;R23F5D31G5L2
3U40BF9R8F2D23G2L8U26"
44 PAINT(142,72),4,5
45 DRAW"BM115,90;S5;R9D5L9U5"
46 PAINT(117,92),4,5
47 PLAY"O5L255T255BB-AA-GG-FE"
48 W$=INKEY$:IF W$="M" THEN GOTO
2 ELSE48
49 '** JUMPING CIRCLE**
50 G=10
51 FORP=1TO8STEP2
52 PMODE1,P:PCLS(4):SCREEN1,1
53 FORX=1TO115STEP5
54 SOUND X,1
55 Y=Y+1
56 COLOR(2+Y)
57 LINE(10+X,10+(X/1.4))-(240-X,
180-(X/1.4)),PSET,BF
58 COLOR5:LINE(10+X,10+(X/1.4))-
(240-X,180-(X/1.4)),PSET,B
59 IFY=>3THEN Y=0
60 NEXTX
61 COLOR5:LINE(0,0)-(255,195),PS
ET:LINE(255,0)-(0,195),PSET
62 CIRCLE(125,95),G,2:PAINT(125,
95),2,2
63 CIRCLE(125,95),G-1,4:PAINT(12
5,95),4,4
64 G=G+35
65 NEXTP
66 FORSH=1TO8STEP2
67 PMODE1,SH:SCREEN1,1
68 FORPZ=1TO95:NEXTPZ:PLAY"O5T25
5L255B-"
69 NEXTSH
70 W$=INKEY$:IF W$="M" THEN GOTO
2 ELSE71
71 GOTO66
72 '**ATOM SMASHER**
73 FORP=1TO8STEP2:PMODE1,P:PCLS(
4):NEXTP
74 PMODE1,1:SCREEN1,1
75 SOUND 1,1
76 COLOR2:LINE(255,0)-(0,195),PS
ET:LINE(0,0)-(255,195),PSET
77 FORS=1TO125
78 GOSUB88
79 CIRCLE(125,95),S,3
80 NEXTS
81 FORP=1TO8STEP2
82 PMODE1,P:SCREEN1,1
83 W$=INKEY$:IF W$="M" THEN GOTO
2
84 FORPP=1TO80:NEXTPP:PLAY"O1L25
5T255CC#D"
85 NEXTP
86 PLAY"L255T255O5B"
87 GOTO81
88 S$="S"+STR$(S)+";"
89 IF S=20THEN PMODE1,3:SCREEN1,
1:SOUND S,1
90 IF S=50THEN PMODE1,5:SCREEN1,
1:SOUND S,1
91 IF S=80THEN PMODE1,7:SCREEN1,
1:SOUND S,1
92 RETURN
93 '**YELLING FACE**
94 PMODE1:PCLS(2):SCREEN1,1
95 CIRCLE(195,70),20,4,1.3,.4,.3
96 CIRCLE(55,70),20,4,1.3,.1,.9
97 CIRCLE(125,85),80,4
98 PAINT(125,85),4,4
99 CIRCLE(90,50),20,3
100 CIRCLE(160,50),20,3
101 PAINT(90,50),3,3
102 PAINT(160,60),3,3
103 FORX=1TO7
104 CIRCLE(160,60),X,2
105 CIRCLE(90,60),X,2
106 NEXTX
107 DRAW"BM120,80;C3;S4;D10R15U1
0"
108 CIRCLE(127,95),15,3,.4
109 PAINT(127,95),3,3
110 CIRCLE(127,135),45,2,.4
111 PAINT(127,135),2,2
112 PAINT(10,10),5,4
113 PLAY"V1":FORSX=1TO30:PLAY"L2
55T255O2V+FF#GG#":NEXTSX:PLAY"V1
5"
114 DRAW"BM127,135"
115 FORS=1TO20STEP3
116 S$="S"+STR$(S)+";"
117 SOUND S,1
118 DRAW S$+"C3;BM-4,+1;L10U2R6U
2L6U4R6U2L6U2R10D6L2D1R2D5"
119 FORPP=1TO150:NEXTPP
120 NEXTS
121 DRAW"BM127,135"
122 FORS=1TO20STEP3
123 SOUND S+20,1
124 S$="S"+STR$(S)+";"
125 DRAW S$+"C3;BM+2,+4;R8E2U8H2
L8D12BU4BR3U4R3D4L3"
126 FORPP=1TO150:NEXTPP
127 NEXTS
128 DRAW"BM15,100;C5;R6D4L3D1R3D
5L6"
129 PAINT(16,100),3,3
130 DRAW"BM230,115;C5;L6D6R6U6"
131 PAINT(230,115),3,3
132 PLAY"O1"
133 FORSX=1TO4:PLAY"L255T255O+CC
#GG#B-BDD#AA#EF":NEXTSX
134 FOREY=4TO6STEP2:PAINT(90,60)
,EY,3:PAINT(160,60),EY,3
135 NEXTEY
136 W$=INKEY$:IF W$="M" THEN GOT
```

```
O2 ELSE 134
137 '**STARBURST**
138 PMODE1,1:PCLS(3):SCREEN1,1
139 FORX=5TO110STEP2
140 QQ=X
141 IFX=>100THEN QQ=105
142 PSET(QQ+15,QQ,4)
143 PLAY"O5L255T255B"
144 PSET(X+12,X-5,3)
145 NEXTX
146 FORC=5TO3STEP-1
147 C$="C"+STR$(C)+";"
148 DRAW C$+"BM120,100;S4;NE40NF
40NG40NH40"
149 PLAY"O1L255T255CC#"
150 NEXTC
151 A=60:B=60:C=30:D=15:E=20:F=1
5
152 FORN=1TO120STEP2
153 X=C+E*SIN(N/A*3.14)
154 XX=X*5
155 M=N*3
156 GOSUB182
157 Y=D-F*Z
158 YY=Y*6
159 W$=INKEY$:IF W$="M" THEN GOT
O2
160 COLOR2:LINE(XX-30,YY)-(270-X
X,180-YY),PSET
161 COLOR4:LINE(XX-30,YY)-(270-X
X,180-YY),PSET
162 NEXTN
163 FORX=3TO108STEP3
164 CIRCLE(120,90),X,2
165 PLAY"L255T255O1EF"
166 CIRCLE(120,90),X-3,3
167 NEXTX
168 FORX=110TO3STEP-2
169 CIRCLE(120,90),X-2,4
170 CIRCLE(120,90),X,3
171 NEXTX
172 FORFC=1TO15
173 CIRCLE(120,90),FC,4
174 PLAY"L255T255O1E-D"
175 NEXTFC
176 FORFF=15TO1STEP-1
177 CIRCLE(120,90),FF,3
178 PLAY"L255T255O1CC#"
179 NEXTFF
180 W$=INKEY$:IF W$="M" THEN GOT
O2
181 GOTO138
182 Z=SIN((90-M)/57.296)
183 RETURN
184 '**DIMENSIONAL SINELINES**
185 PMODE3,1:PCLS(4):SCREEN1,1:P
LAY"O5V30":FORSX=1TO4:PLAY"L100T
10-V<BGEC":NEXTSX:PLAY"V15"
186 PMODE3,1:PCLS(5):SCREEN1,1
187 B=0:S=0:D=0:Q=0:X=0:I=0
188 B=B+I
```

```
189 S=S+.1
190 D=D+Q
191 IF B>250 THEN PCLS:I=-2
192 IF D>180 THEN Q=-2
193 IF D<5 THEN Q=2
194 IF B<5 THEN I=2
195 X=(SIN(S)*129)+129
196 COLOR2:LINE(X,D+1)-(D,B+1),P
SET:COLOR3
197 LINE(X,D)-(D,B),PSET:COLOR4
198 LINE(X,D+1)-(D,B+1),PSET
199 W$=INKEY$:IF W$="M" THEN GOT
O2
200 GOTO188
201 '**DO IT YOURSELF**
202 CLS(7)
203 PRINT@37,"** DO IT YOURSELF
**";
204 PLAY"L4T2O4DCFL8GO5CO4L4AL8G
O5CO4L4AL3F"
205 PRINT@128," JOYSTICKS CONTRO
L THE ENDS OF   THE DRAWING LINE
.               > PRESS [B] FOR
BLUE LINE       >       [R] FOR
RED LINE        >       [G] FOR
GREEN LINE      >       [C] FOR
CIRCLES"
206 PRINT@320," >       [CLEAR]
TO ERASE        >       [M] FOR
MAIN MENU"
207 PRINT@448,"  ** PRESS ANY KE
Y TO BEGIN **"
208 EXEC44539
209 PLAY"O1V15L6T2":FORSX=1TO4:P
LAY"T>V+O+CFEDB-":NEXTSX:PLAY"V1
5L255T255"
210 PMODE3,1:PCLS(3):SCREEN1,1
211 CP=4
212 J=JOYSTK(0)*4:K=JOYSTK(1)*3
213 L=JOYSTK(2)*4:M=JOYSTK(3)*3
214 COLOR CP+1:LINE(J,K)-(L,M),P
SET
215 COLOR CP:LINE(J,K)-(L,M),PSE
T
216 CP$=INKEY$
217 IF CP$="R" THEN CP=4:PLAY"O5
B"
218 IF CP$="G" THEN CP=2:PLAY"O5
G"
219 IF CP$="B" THEN CP=3:PLAY"O5
F"
220 IF CP$="C" THEN PLAY"O5AB-B"
:CIRCLE(J,K),10,5:PAINT(J,K),CP,
5:CIRCLE(L,M),10,5:PAINT(L,M),CP
,5
221 IF CP$=CHR$(12) THEN PLAY"O5
C":GOTO210
222 IF CP$="M" THEN GOTO2
223 GOTO212
224 PCLEAR8:GOTO2
```

16K ECB

Astound your non-computing friends by making the CoCo a "know-it-all"



The CoCo Quiz Master

By Bill Bernico

One of the things that most impresses non-computerists is a quiz-type program with answers evaluated by the computer. The computer lets you know if the answer you selected is right or wrong, and you get some sort of score at the end.

These folks are likely to ask, "How does the computer *know* which is the right answer?" Sounds silly now that I have a few years of hacking behind me, but it was the very question I asked before I ever laid hands on a computer.

Obviously, the computer doesn't know the answer. It's programmed to search the `DATA` statements to find the right answer that you've put there — nothing more, nothing less. This program is a good example of that kind of technique.

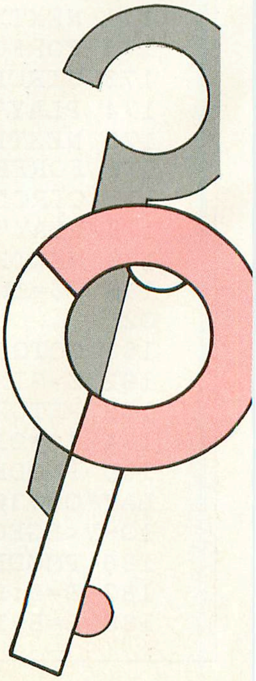
I just happened to choose questions on computing for this quiz; if you have a certain category you'd rather build your quiz around, by all means feel free to change the `DATA` statements. It's that simple.

Each `DATA` statement is made up of five parts. The first piece of `DATA` tells the computer which of those answers is the right one. Look at Line 300 in the listing. The `4` at the end of the `DATA` statement tells the computer that the first answer is the correct one.

Using this technique, you can make up your own quiz. Just make sure you follow the flow as presented here.

Bill Bernico is the author of over 200 Color Computer programs and is a frequent RAINBOW *contributor whose hobbies include golf, writing music and programming. Bill is a drummer in a rock band and lives in Sheboygan, Wisconsin.*

(Questions or comments concerning this program may be directed to the author at 708 Michigan Avenue, Sheboygan, WI 53081. Please enclose an SASE when requesting a reply.) ☐



Sugar Software

☞ Just For the Fun of It ☜

Order any item by June 30, 1989, and you may have your choice of either the **Silly Syntax** *story creation game* (including two stories) or the **Flying Tigers** *arcade game* for only **$1.95!**

CALLIGRAPHER

CoCo Calligrapher - Turn your CoCo and dot-matrix printer into a calligrapher's quill. Make beautiful invitations, flyers, certificates, labels and more. Includes three ½ inch high fonts. Works with many printers such as Epson, Gemini and Radio Shack. Over 135 additional fonts are available (see below). Tape/Disk; **$24.95**.

OS9 Calligrapher - Prints all the same fonts as the CoCo Calligrapher. It reads a standard text file which contains text and formatting codes. You may specify the font to use, change fonts at any time, centering, left, right or full justify, line fill, margin, line width, page size, page break and indentation. Similar to *troff* on UNIX systems. Includes the same 3 fonts with additional fonts available below. Disk only; OS9 Level I or II; **$24.95**.

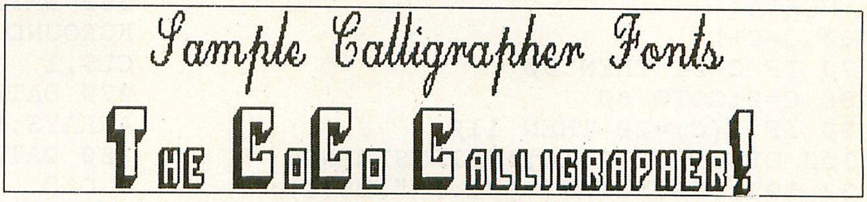
Calligrapher Fonts - Requires Calligrapher above. Each set on tape or disk with 8 to 10 fonts; specify RSDOS or OS9 version; **$14.95** each:

Set #1 Reduced and reversed originals;
Set #2 Old Style and Broadway;
Set #3 Antique and Business;
Set #4 Wild West and Checkers;
Set #5 Stars, Hebrew and Victorian;
Set #6 Block and Computer;
Set #7 Small: Roman, Italics, Cubes, etc;
Set #8 Novelty fonts; NEW
Set #9 Gallant and Spartan; NEW
Set #10 Several Roman fonts;
Set #11 Gothic and Script;
Set #12 More Roman and Italic;
Set #13 Several Courier fonts; NEW
Set #14 Modern and Screen; NEW
Set #15 Tektron and Prestige. NEW

Economy Font Packages available on disk only, with 25 to 30 fonts; specify RSDOS or OS9; **29.95** for any one or save by buying two or more at **$19.95** each:

Pkg #1 - Above font sets 1, 2 and 3;
Pkg #2 - Above font sets 4, 5 and 6;
Pkg #3 - Above font sets 7, 8 and 9;
Pkg #4 - Above font sets 10, 11 and 12;
Pkg #5 - Above font sets 13, 14 and 15.

Calligrapher Combo Package - Includes the Calligrapher and any two Economy Font Packages (your choice) for only **$59.95.** ☜ **New Low Price!** Specify RSDOS or OS9.



The OS9 Font Massager - This OS9 utility program allows you to do many things to Calligrapher font files. You may create new fonts, modify existing fonts, invert fonts, compress fonts, double the height and/or width, halve the height and/or width and convert between OS9 and RSDOS formats. **$19.95.**

INFORMATION MGT.

TIMS (The Information Management System) - Tape or disk, fast and simple general data base program. Create *files* of *records* that can be quickly sorted, searched, deleted and updated. Powerful printer formatting. Up to 8 *user* fields, sort on up to 3 fields. Tape/Disk; **$19.95**.

TIMS Mail - Tape or Disk based mailing list management program. Files are compatible with TIMS. Fast and simple to use. Supports labels 1, 2 or 3 across, 2½ to 4 inches wide. Tape/Disk; **$19.95**.

TIMS Utility - Utility companion for TIMS and TIMS Mail for multi-term search (*AND* and *OR* logic), global change and delete, split large files and more! Tape/Disk; **$14.95**.

TIMS Combo Package - All three of the above programs: TIMS, TIMS Mail and TIMS Utility on one disk - **$34.95**.

EDUCATIONAL

Trig Attack - Ages 9 and up. An educational arcade game where players learn important math concepts as they play. Sound effects, colorful graphics. Excellent manual includes an introduction to trigonometry. Tape/Disk; **$19.95**.

The Educational Combo - The Combo includes these educational (and entertaining) games:

Silly Syntax (ages 5 and up) story creation game with 2 stories
Galactic Hangman (ages 7 and up) animated graphics, with a 700 word vocabulary
The Presidents of the USA (ages 10 and up) a presidential trivia game
The Great USA (ages 9 and up) a trivia game of the states
Trig Attack (ages 9 and up) Zap those *Trigs*

All five programs on one disk; **$49.95** (save $50!).

SPECIAL INTEREST

Rental Property Income and Expense Management Package - Maintain rental property income and expense records and print reports. 28 expense categories. *This program may be tax deductible.* Disk only; **$29.95**.

CoCo Knitter - Easy to use program to display or print instructions to knit a sweater: Cardigan or Pullover; Round or V-neck; Raglan or Set-in Sleeve; 3 weights of yarn; 8 sizes from baby to man. Tape/Disk; **$19.95**.

For a complete catalog of Sugar Software products and fonts, send a stamp and a label.

RAINBOW CERTIFICATION SEAL

MasterCard VISA

*TRS-80 is a trademark of Tandy Corp.

SUGAR SOFTWARE
P.O. Box 7446
Hollywood, Florida 33081
(305) 981-1241

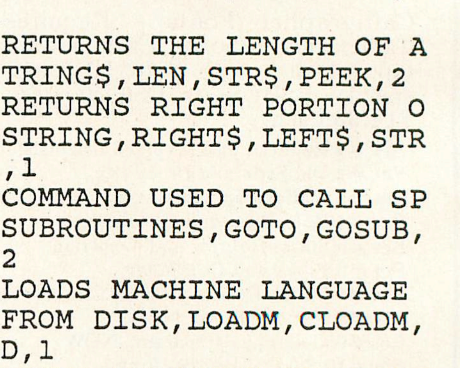
All programs run on the CoCo 1, 2 and 3, 32K Extended Basic, unless otherwise noted. Add $1.50 per tape or disk for shipping and handling. Florida residents add 6% sales tax. COD orders add $5. Dealer inquiries invited. Orders generally shipped in 24-48 hours. No refunds or exchanges without prior authorization.

The listing: COCOQUIZ

```
0 'COPYRIGHT 1989  FALSOFT,INC
10 'COCOQUIZ
20 'FROM KROMICO SOFTWARE
30 'BY BILL BERNICO
40 '
50 DIMA$(20),B$(20),C$(20),D$(20
),E$(20),B(20):FORA=1TO20:READA$
(A),B$(A),C$(A),D$(A),E$(A),B(A)
:NEXTA
60 C=C+1
70 IF C<21 THEN 90
80 C=0:GOTO 60
90 IF B(C)=20 THEN 110
100 CLS:PRINTA$(C):PRINTSTRING$(
32,191):PRINTTAB(9)"1.) ";B$(C):
PRINTTAB(9)"2.) ";C$(C):PRINTTAB
(9)"3.) ";D$(C):PRINTTAB(9)"4.)
"E$(C):GOTO130
110 D=D+1:IF D=21 THEN 210
120 GOTO 60
130 PRINT:PRINTTAB(7):INPUT"SELE
CT 1-4)";E:PRINT
140 IF E<1 OR E>4 THEN 130
150 F=F+1
160 IF E=B(C)THEN G=1:B(C)=20:GO
TO180
170 G=0
180 IF G=1 THEN 200
190 PRINTSTRING$(32,175);:SOUND1
,2:PRINT"WRONG!  WE'LL TRY THIS
ONE LATER";:PRINTSTRING$(32,175)
;:GOSUB 290:GOTO 60
200 PRINTSTRING$(32,159);:SOUND1
91,2:PRINT"RIGHT!  THAT'S ONE MO
RE FOR YOU.";:PRINTSTRING$(32,15
9);:GOSUB 290:GOTO 60
210 IF F=20 THEN 230
220 CLS:PRINT"YOU MISSED";F-20;"
QUESTIONS":GOTO 240
230 CLS:PRINT"VERY GOOD...NO WRO
NG ANSWERS
240 PRINT@324,"CARE TO TRY AGAIN
 (Y/N)
250 IN$=INKEY$:IFIN$=""THEN 250
260 IF IN$="Y"THEN RUN
270 IF IN$="N"THEN CLS:LIST-30
280 GOTO 250
290 PRINT@484,"HIT ANY KEY TO CO
NTINUE";:FORX=1507TO1531:POKEX,P
EEK(X)-64:NEXT:EXEC44539:RETURN
300 DATA RESERVES BYTES OF STRIN
G SPACE,CLS,CLEAR,CONT,OPEN,2
310 DATA CHECKS THE KEYBOARD AND
 RETURNS THE KEY THAT WAS HIT (I
F ANY),RIGHT$,SCREEN,JOYSTK,INKE
Y$,4
320 DATA SETS THE COMPUTER'S POI
NTER BACKTO THE FIRST ITEM ON TH
E FIRST  DATA LINE,RENUM,RESTORE
,TROFF,PPOINT,2
330 DATA PRINTS A STRING OF CHAR
ACTERS   SPECIFIED BY ASCII CODE
,STR$,CHR$,STRING$,LEFT$,3
340 DATA RESETS A POINT TO THE B
ACKGROUNDCOLOR,RESET,SET,PSET,PR
ESET,4
350 DATA STORES GRAPHICS FROM SO
URCE ONTOSTART/END RECTANGLE ON
A SCREEN,GET,PUT,SOUND,INT,2
360 DATA SETS FOREGROUND AND BAC
KGROUND  COLOR,COLOR,CLS,PAINT,P
CLS,1
370 DATA DIMENSIONS ONE OR MORE
ARRAYS,DATA,DIM,GOSUB,LIST,2
380 DATA REPLACES A PORTION OF A
N OLD    STRING WITH A NEW STRIN
G,LEFT$,RIGHT$,MID$,INKEY$,3
390 DATA ERASES EVERYTHING IN ME
MORY,CLS,PCLS,NEW,CLEAR,3
400 DATA SELECTS RESOLUTION AND
FIRST    MEMORY PAGE,PCLEAR,PMOD
E,PCLS,PRESET,2
410 DATA PRINTS NUMBERS IN A SPE
CIFIED   FORMAT,PRINT,PUT,READ,P
RINT USING,4
420 DATA LETS YOU INSERT COMMENT
S IN A   PROGRAM LINE,REM,LIST,D
EL,SAVE,1
430 DATA RETURNS THE LENGTH OF A
 STRING,STRING$,LEN,STR$,PEEK,2
440 DATA RETURNS RIGHT PORTION O
F ANY    STRING,RIGHT$,LEFT$,STR
$,STRING$,1
450 DATA COMMAND USED TO CALL SP
ECIFIED  SUBROUTINES,GOTO,GOSUB,
GET,LIST,2
460 DATA LOADS MACHINE LANGUAGE
PROGRAM  FROM DISK,LOADM,CLOADM,
LOAD,CLOAD,1
470 DATA JUMPS TO SPECIFIED LINE
 NUMBER,GOSUB,GET,GOTO,LLIST,3
480 DATA LISTS PROGRAM LINES TO
PRINTER,LIST,PRINT,INPUT,LLIST,4
490 DATA SELECTS EITHER GRAPHICS
 OR TEXT DISPLAY AND THE COLOR S
ET,SCREEN,PCLS,PPOINT,PMODE,1
```

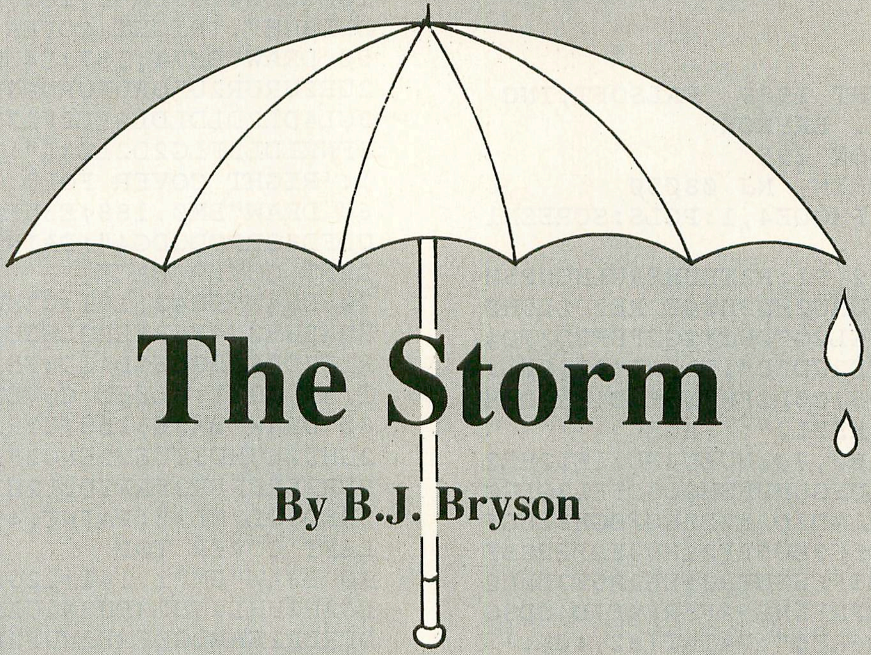
Maxwell Mouse

By Logan Ward



32K ECB

Saving your CoCo for a rainy day. . .



The Storm

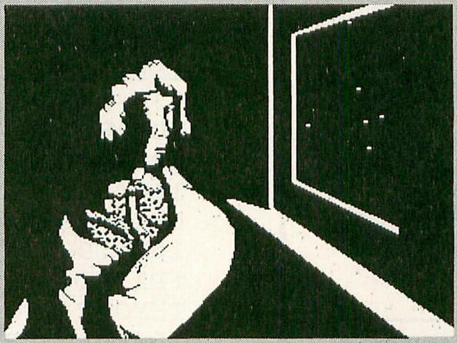
By B.J. Bryson

Wrapped in warm cozy covers, a child watches the pouring rain from a second-story bedroom window, jumping every time the lightning flashes in the midnight sky and shivering with delight when the thunder rumbles in the distance. A childhood moment seized my thoughts as I took pencil in hand and put the image to paper.

But something was missing — the pitter-patter of raindrops on the windowpane, the flashes of lightning, the distant rumbling of thunder. It occurred to me that my CoCo might be able to help.

So I drew a child's face on a sheet of graph paper and filled in the squares outlining the area of my drawing. Then I cranked up the computer and set it to do graphics with Line 10. Next, I wrote the `DRAW` and `PAINT` instructions in Line 20, using the outlines on the graph paper as a guide in creating the `DRAW` instructions. I followed this procedure with the hair, clothes, cover and window, producing lines 30 to 180.

After the window came the lightning. I concentrated on the bright flash lightning creates. Drawing and erasing the highlights of lightning flashes would have taken too long, so I decided to make a separate drawing of the highlighted scene and use page-flipping for lightning. With this plan in mind, I moved to graphics pages 5 to 8 and copied the picture to the new area with Line 190.



Going back to the original drawing, I added highlights with an orange pencil, copied these to the appropriate areas of the graph paper copy with the same pencil, and filled in the squares, outlining only the orange areas. I then wrote the `DRAW` and `PAINT` instructions in lines 200 to 290, using the new outlines as a guide in creating those instructions for drawing.

When finished with the highlights, I went back to the unhighlighted picture with Line 300, tossed in some thunder and lightning using Line 310, and kept everything going with Line 1000.

At this point, the program could do its thing. But something seemed to be missing. Suddenly, it struck me like a bolt. There was no rain!

At first, I tried randomly plotting dots in the windowpane area, but it looked more like snow than rain. Since I couldn't think of any other way to simulate rain falling fast enough to look realistic, I decided to try raindrops trickling down the window. I began by randomly choosing a set of coordinates in Line 320. Line 330 saves the chosen coordinate values in variables `H` and `V` and moves the vertical coordinate down a few spaces. If the coordinates aren't in the windowpane area, Line 340 randomly assigns new values that are within the confines of this area. Finally, lines 350 to 370 reset the pixels pointed to by the `H` and `V` variables, set the pixels pointed to by the new coordinate values, and make a soft pitter-patter sound.

And there it is! I hope you enjoy this program as much as I enjoyed writing it. Please feel free to change and add to the program as the inspiration directs you. Most of all, have fun!

(Questions or comments concerning this article may be addressed to the author at P.O. Box 295, Manahawkin, NJ 08050. Please include an SASE when requesting a reply.) ❑

B.J. Bryson has been working with computers since 1982. He enjoys creating music, graphics and animation on the Color Computer and hopes to find a computer game publishing company looking for a talented programmer.

50	108	240	55
110	242	300	75
190	108	END	123

The Listing: STORM

```
1 ' STORM
2 ' COPYRIGHT 1989  FALSOFT,INC
3 ' BY B. J. BRYSON
4 ' P. O. BOX 295
5 ' MANAHAWKIN, NJ 08050
10 PCLEAR8:PMODE4,1:PCLS:SCREEN1
,1
20 DRAW"BM82,91;R3ERUHERULHUNR5H
E2R4UEU2HE2UHU2HU3HU6E2RE2U2L5H2
UGL3GNL3GRFGL2GFDNGF2G2FDF2D3FD4
GDGD2GD2GDFD2GDFD":PAINT(83,90):
DRAW"BM90,75;C0L2BH2NDEUC1BR8BUH
U7GND2E2ND8HE2L2":'FACE
30 DRAW"BM102,74;HUEU4HU11EU2HL2
U2H4GFDLUHLUHGUHUHUHGDGD5FL3GL7G
DLGLG4D5FDLHGDFD2F2D2HGFDGH3LHGF
D5LH2U2H2ND5U3HU6EF2EHU3FRFEH2EF
2EHU3HU4RER5FEH2UHR2FEH2R5F3EHU2
EUEUR2FEHURFRFEH2R2F5RFRF7D4GD8G
DFD11RU7DFD6RU5":PAINT(82,40):'
HAIR
40 DRAW"BM68,191;ULU2LU2NFLU3LUH
2UHU4HU5R2ER3FR3FR3FEH2L2HLURERE
REREHLGLGL4HU2EUE4UE3UE9RERE6REU
EUEU2EU4HU4HU3HU2HU4H2U2HUHU2EFD
FDFEUHU2RF2DF8L2HLGFRFRFR2F2RF4R
F3RF5DFDFDF3D12GD3GD3GD2GDGDG3DG
10DG6DG4LG9BM65,183;RF3RFRFRFRF2
DBL8UH":'RIGHT COVER
50 DRAW"BM74,157;E4U2RU2RUR2URUR
2UR2URUR2URURURURUR2UR2EUR3ENRGL
3GL4DL2DLDLDL2FL2FL3FL3FNRL2FNRL
3FNRLDL2FLG2D2LD3L":PAINT(80,191
):'RIGHT COVER FOLD
60 DRAW"BM0,188;E3UE2U2EUEUE2UE3
UDFD8GD3GDGDG4":PAINT(0,191):'
LEFT COVER BACK
70 DRAW"BM42,191;U2HU2HUHU2HUHU3
HUH2UH2U4F6RFEH2LH3U2ERE2U3H2R3F
R2F2D2FD5GD6GD4GD4FD2FDFD2":PAIN
T(43,191):'LEFT COVER BOTTOM
80 DRAW"BM36,155;U2R2E2U4HUHUHUH
2UHU2HUHU3EUEU2ENU2FDFDFDF5RFR2F
RFR2FRFRFR2FRF3D2L2H3GF2D2GL7HGF
2RFD2GL7HL9":PAINT(45,150):'
LEFT COVER TOP
90 DRAW"BM71,141;L2ULHLGDNFLHEUH
LG2H2UHL2UHL3EUHNLU2H2NLGNU2R3NE
DFRER2FNRDGDFRE2NUF2RR2FRNFLGDF2
RER2NEFNDHLG2D2":PAINT(65,137):D
RAW"H5C0LURURDBL4DLULURBL3LBU2LE
HDHDBH2UC1U":'LEFT PJ BOTTOM
100 DRAW"BM73,134;LULUHUH2LHNLEU
HLG2HLHLH2GU2L3GHL2EHGU2NLD2R3EF
RFRF2R3NU2R2ENHR2NU2FGDFR2D2NR2D
2":'LEFT PJ MIDDLE
110 DRAW"BM67,120;U5EU3G2LNH2LG2
LHU2NRFLHLD4FDR2ER2ND2R2F2D":PAI
NT(65,116):DRAW"U6C0LFL2FLBLLC1L
C0LEL2E2":'LEFT PJ TOP
120 DRAW"BM66,109;C1LHLHL2U3ER2E
R2ER4GDGDGDGHLG":PAINT(66,106):'
LEFT COLAR
130 DRAW"BM72,104;RFNDL3FBD4ND5F
ND13ED17FNU10FNU5FDU4FD2EDRFBG2L
DRDRD4FU6ED5":'BUTTONS
140 DRAW"BM75,102;ER2E2UER2F2RF2
DFGFLHGFLHGLHUNR2H2LH":PAINT(81,
102):DRAW"BM74,99;R4UEU3L3GDGD2"
:PAINT(75,97):'RIGHT COLLAR AND
THROAT
150 DRAW"BM75,104;RDR3DFR2D2FRE2
FRE2UD4GD2GDL2GDFR2E3URD5LG2D2R3
NUL3D2LUHLGH2LU2LHLR2EUHL2GUR2EU
HL2UE2ULEUHU2":PAINT(80,111):'
RIGHT PJ TOP
160 DRAW"BM77,120F4DL2NU3FDLFR5D
R2GD2L3NFUHULU":'RIGHT PJ BOTTOM
170 DRAW"BM84,121;C0R2DL2BR4UBU2
RBU7BL2LFL2FLBL2DBD2DL2ELBU2LEL2
URBE2RDLBH2LEL2ELBEBURC1D":'LEFT
TOP PJ DESIGN
180 DRAW"BM164,17;M164,101;M223,
```

MUTANT MINERS

Battle mutant uranium miners in a run for your life, action-packed, arcade style game. 10 levels with 10 screens per level!

100% Machine Language (CoCo 1, 2 or 3 and Joystick) $19.95

BURIED BUXX

Fly your helicopter into enemy territory, dig up the loot and return to base.

Watch out for the ever-present patrol aircraft and ground based missiles.

100% Machine Language (CoCo 1, 2 or 3 and Joystick) $19.95

See Review 'Rainbow' 2/89

REVENGE of the MUTANT MINERS

CoCo 3 owners rejoice! Muntant Miners is back with game configuration mode and much more!

Joystick required. $19.95

Many more programs available including: Milestones, Fontgen, Diskease, Picture Puzzles, Quantum Leap and more.

JR & JR SOFTSTUFF

P.O. BOX 118 • Lompoc, CA • 93438 • (805) 735-3889

Orders Accepted 24 Hours a Day.

All Programs on Diskette Only.

All orders add $3.00 shipping. C.O.D. orders $4.00 additional

You can usually get us in person from 5-9 PM PST.

If you get the machine, leave a message and we will call back at your convenience.

CALL OR WRITE FOR A COMPLETE LIST OF AVAILABLE PROGRAMS.

```
131;U3M165,101;M223,130;UM165,10
1;M165,17;M221,0;L12M164,17;M212
,0;R3M165,17;M218,0; BM151,116;M
151,0RM152,116;LM255,186;BM230,1
91;M127,112;R3M149,118;R2":PAINT
(245,191):'WINDOW
190 PCOPY1TO5:PCOPY2TO6:PCOPY3TO
7:PCOPY4TO8:PMODE4,5:SCREEN1,1
200 DRAW"BM41,191;U7LND7LND7U3LN
D4U2LND5LUND6LU2ND5HND2LU2LUHUHU
2BR7BU3L4BL3BD3HU2EU2EU5HUHLHUHU
3HU5HU9EU3EUE3U2HLHU2EUE5URURURU
RURURURUF2L2FL2DGDLG4DFEUD6FD5":
PAINT(33,155):'LEFT COVER
210 DRAW"BM52,191;U6HUHU2HU5EU4E
U6HUHUHLHL4HLUR6FR4FR4FRFRE2UH4L
HLHNR5NR6DNR6FNR6RFR2U6H2NR7FNR7
FNR7RFNR5FNR4FNR2U6LH":PAINT(50,
191):PAINT(56,155):' LEFT COVER
INSIDE
220 DRAW"BM74,191;L3ELULULBD3BL2
HUHU2LULEL2EL2EUGNU6LU12D3GD4R17
U8HHHL2HNL2UBU2L3NR5ERHR6U3E2UEU
5REU2R2EUR2URURERE2RE3R3ER3ER BM
116,191;UEUE4UE2EUE2UEHU2E3UEE4U
E2UEU3EU2EU6HU4HUHUHUH2UH2":PAIN
T(110,191):'RIGHT BLANKET BOTTOM
230 DRAW"BM61,108;L2HGNL2U2L3DLH
ELHUE3RER6F2R2":PAINT(59,104):DR
AW"BU2R5DR2UNRHL10HU3EUERERFR2FR
FR2FR2":PAINT(65,95):DRAW"BM95,1
03;HUHULULH3LHUE2UE2F2DFDBR2EHUH
2DFDF":PAINT(89,93):'COLAR, NECK
AND RIGHT BLANKET TOP
240 DRAW"BM88,84;D2GD2GDGL7HLHLH
LHU2HU2HU3EU2EUEU5EUE2R6HUL2BU5R
L2ERDBE2BU2R2L3HR2ER3HR5HRU2LNU2
RF2NL2DNL2DNL2FNL2BR3ED5LR2NU3BD
2DLDBD3BL4D2FD3FD2FDU3RNU8LD3GDL
D3GD2NL5BG2G3":PAINT(75,84):'
FACE
250 DRAW"BM104,74;GDGUL2DLULUR4H
L2URU2RU4LND4U5LU2FU7RU2GULU2LUH
3D3NRGULU2":'RIGHT HAIR
260 DRAW"BM62,78;LULH2LD2RD3RD3H
GNU6U4LNU3GNU13HNU25UHNU20U3HNU1
4U4LU9FE3NUND2NF3R3U2LNUNDR2F2RF
EHL2NHR2U3LU2NU4LU6REND3RND3RD2N
R4ER3UH2UNR3FR3FH2UHR2DR4F3RU6RU
3F2R3H2U3LFNDF3RU3L":'HAIR
270 DRAW"BM58,138;LBH2LBH2LHLDHN
L2U4FDG2U2NLUNL4NRURE NL3UNL4HLE
UR2FDR2GR4DRL12D2L2HULUR3U2 BRL4
ND3LU4R3NGUHL2ND2REF2R2DRFNR2GL7
U4R2NR3NU3RU3RNU2R3D2R2NR2ULU4NL
3NU2RDR3UUH2LR4GNR4FR3GLFNR3FL4D
RDR2NUFRDRNU2FNU2R2":'LEFT PJ
280 DRAW"BM69,141;DRU2R2NU6RND2N
U3RU3BR12BU2ENU3RNU6EHUERFU2FNR2
UNR2HL2NDR3UER4LND2HL2U5RND6ED3R
2DHU5HNULNGNLHNLRU4FL2BL2LBU4R2U
3HND4UH2":'RIGHT PJ
290 DRAW"BM223,129;M223,0; BM149
,118;M136,112;L3M149,118;M132,11
2;L2M149,118;":PAINT(215,100):'
WINDOW
300 PMODE4,1:SCREEN1,1:' SHOW
UNHIGHLIGHTED PICTURE
310 IFRND(100)=1THENFORT=1TO9+RN
D(9):PMODE4,1+((RND(2)-1)*4):SCR
EEN1,1:NEXTT:PMODE4,1:SCREEN1,1:
PLAY"O1T255L255V31CDGFEV25BGDCV1
0AFEBV15GEDBACV5EDBF":' THUNDER
AND LIGHTNING
320 R=RND(10):'CHOOSE COORDINATE
330 H=H(R):V=V(R):V(R)=V(R)+S(R)
:'SAVE CORDINATE VALUES AND MOVE
VERTICAL COORDINATE DOWN
340 IF V(R)>27+H(R)/2.25 OR H(R)
<165 THEN H(R)=165+RND(51):V(R)=
22+RND(90)-(H(R)-80)/8:S(R)=RND(
3):'CHOOSE NEW COORDINATE VALUES
IF COORDINATES AREN'T IN WINDOW
350 PRESET(H,V):PRESET(H+1,V):'
ERASE OLD VALUES
360 PSET(H(R),V(R),1):PSET(H(R)+
1,V(R),1):'PLOT NEW VALUES
370 IFRND(10)>3THENPOKE140,250+R
ND(5):EXEC43350:' PITTER-PATTER
SOUND
1000 GOTO310:' GO BACK TO THUNDE
RAND LIGHTNING ROUTINE
```

BYTE BACK
AT TAXES
WITH TRY-O-TAX

- available for CoCo, MSDOS, TRS-80
- revised for '88 law changes
- prompts for easy guided use
- calculates 1040, 1040A, 2441, 2106, 6502
- calculates schedules A-F, SE
- computer generated substitute forms
- FREE TAX ESTIMATE PROGRAM

PERSONAL CHECKS WELCOME
SHORT FORM ONLY $15.00
NO CREDIT CARDS, C.O.D.

$44.99 + 3.00 SHIPPING

TRY-O-BYTE, 1008 Alton Circle, Florence, S.C. 29501, (803) 662-9500

Auto-run BASIC programs by typing just their filenames

EZRun

By Fred Kolesar

Wouldn't it be nice if BASIC programs would load into CoCo's memory and run just by typing it's filename. No more typing `RUN` then fumbling for that *&!% shift quote (if I had a nickel for every time I've missed the shift key and typed `run2` *filename*). *EZRun* makes several changes to the CoCo including a patch to load and auto run BASIC programs with just a filename. Table 1 gives a brief explanation of what *EZRun* does.

To use *EZRun* on a 64K CoCo just put a `REM` at the start of each line marked "CoCo 3 Only" and be sure the CoCo 2 is in the all-RAM mode before running *EZRun*.

I've included a fully commented *EDTASM* source code (Listing 1) for the auto-run module. The source file is a conditional assembly. Setting the expression on Line 600 to `0` or `1` will assemble the object code for either Disk BASIC 1.0 or 1.1 respectively. Beginners, don't use the `/SR` switch if you assemble this file. *EZRun* is a multiple `ORG` program and cannot be assembled as a single record.

Fred Kolesar is the owner of a small business in Westfield, Pennsylvania. After buying his first computer in 1984, he quickly became addicted to programming. He and his wife, Cindy, have two daughters, Kristina and Nichole, ages seven and six, who are now programming his old CoCo 2.

At the expense of only five bytes I've made it PC relative. *EZRun* will function properly anywhere in memory as long as the hook at $AF90 points to the new location. Memory address $AF90 is a `JSR` instruction with the next two bytes being a hexadecimal address pointing to *EZRun*.

When you press ENTER after typing at the keyboard, BASIC must intepret and execute what you have typed. BASIC attempts to match what you have typed with its list of reserved words. If it can't find a match, BASIC assumes you are assigning a variable name and jumps to its `LET` routine. `LET` grabs the variable name then looks for an = token (for example, `TEST31`). When BASIC checks for the equal sign and it's not there it returns a Syntax Error message. This is where *EZRun* steps in.

EZRun performs the syntax check and returns control to BASIC if the equal

Table 1

Lines	Description
12	Contains the Read/Data `PALETTE` command. Data can be any color number 0 to 63. The first eight numbers are background palettes 0 to 7 and the second eight are foreground pallettes 0 to 7. A single space separates the foreground and background color numbers. The space is for quick editing of the 16 palettes. While in the Edit mode press S (search subcommand) then the space bar; the edit cursor jumps to the center of the 16 palettes. To change a background palette count backward from `7`. For foreground palettes count forward from `0`. If you're not using a CoCo 3 put a `REM` at the start of Line 12. In this way, should you upgrade to a CoCo 3, you'll need only delete the `REM` to use the CoCo 3 line. Do the same with all "CoCo 3 Only" lines.
22	Contains the printer baud rate. Change the value after the comma to suit your system. CoCo's standard baud rate is 600 (`POKE 150,87`). Baud 1200 is `150, 40`; 1800 is `150, 25`; and 2400 is `150, 18`. The printer switches must be set equal to the CoCo's rate or you get garbage on the printer. Remember, higher baud rates mean faster printing: Set the printer switches to the highest setting available and make the appropriate poke to match the CoCo with your printer.
24	Contains the disk-drive step rate. If you get I/O errors when trying to load at this rate, press the Reset button and put a `REM` at the start of Line 24.
26	Cuts the disk access delay in half. Try it, if it doesn't work for you, do as in Line 24.
28	Enhances the OK prompt. Address `2394` holds the default drive number. Poking `44014` with this value `+48` changes the `0` to the default drive number. Poking `44015,62` changes the `K` to the Greater Than symbol >.
34 to 44	Patch the `DRIVE` command so that it will update the prompt whenever it's used. For example, type `DRIVE 2`, then press ENTER and the prompt changes to `'2>'`.

sign is present. Otherwise *EZRun* assumes you have typed a filename and attempts to load and run the program.

Because Color BASIC's `LET` routine only preserves the first two characters of a viable name, *EZRun* has to temporarily patch Disk BASIC's filename routine. Lines 2600 to 4400 make a patch that brings Disk BASIC back to the subroutine `GETLEN`, lines 5300 to 8000. `GETLEN` removes the hook in Disk BASIC and converts any operator tokens that Color BASIC may have put into the input buffer. The Subroutine then returns to Disk BASIC with the input buffer location in Register X and the filename length in Register B. After Disk BASIC has finished processing a valid filename, control returns to lines 4500 to 4900, which send control to CoCo's load and run routines.

Note: Lines 2000 to 2200 will abort

Lines	Description
	Type `DRIVE 0` then press ENTER. Now the prompt is `'0>'`.
48	Lets you enter `PCLEAR 0` through `8` within a program or direct mode.
52	Replaces the awkward SHIFT-@ combo that puts CoCo on hold . Pressing BREAK alone does the job of holding the CoCo, and SHIFT-BREAK will function as the BREAK key.
54	Makes SHIFT-space bar function as SHIFT-Up arrow. I use the `EDIT` command a lot while programming in BASIC and the space bar is a lot handier than the arrow.
60 to 76	Poke the *EZRun* object code into memory and patch the `LET` statement. This allows you to load and run a BASIC program just by typing its filename. `LOAD` and `RUN` work as before.
90 to 95	Error check data lines 66 to 70. This must be done separately from the actual poke routine in Line 76. Assigning a new variable while making the patch will lock up the computer.

Listing 1:

```
AUTO RUN PATCH  **  12/88                    EDTASM+/01.00.00    PAGE 1


                    00000 ***     Copyright (C) 1988
                    00100 ***     Kolesar B/S
                    00200 ***     7 Ladd Road
                    00300 ***     Westfield, pa. 16950
                    00400
                    00500         TITLE    AUTO RUN PATCH  **  12/88
          0001      00600 DBFLAG  EQU     1        * Conditional assembly flag
                                                     0 = 1.0 dos / 1 = 1.1 dos
          0001      00700 DB10    EQU     1
          0000      00800 DB11    EQU     0
          0076      00900 STORE   EQU     $76      * 2 unused bytes in low ram
                    01000
                    01100 ***     org hook where LET statement does syntax check
AF90                01200         ORG     $AF90
AF90 BD   FAA0      01300 HOOK    JSR     FNCK     * new syntax check for LET
                    01400
                    01500 ***     org new syntax check in ram above Super E.C.B.
FAA0                01600         ORG     $FAA0
FAA0 E1   9F 00A6   01700 FNCK    CMPB    [$A6]    * do syntax ck for "="
FAA4 26   02        01800         BNE     MAYBE    * not "="! could be filename
FAA6 0E   9F        01900         JMP     $9F      * "=". process new variable
FAA8 D6   68        02000 MAYBE   LDB     $68      * msb of line#/$FF=direct mode
FAAA 5C             02100         INCB             * $FF+1 is 0
FAAB 26   4B        02200         BNE     ERROR    * not 0! can't be direct mode
FAAD 86   03        02300         LDA     #3       * direct mode. do RUN"Filename
FAAF B7   0959      02400         STA     $959     * run flag. 3=close files/run
FAB2 F7   095E      02500         STB     $95E     * merge flag.  0=no merge
                    02600         COND    DB10-DBFLAG
                    02700         LDD     $C8A2    * D-Basic 1.0 jsr address
                    02800         ENDC
                    02900         COND    DB11-DBFLAG
FAB5 FC   C950      03000         LDD     $C950    * D-Basic 1.1 jsr address
                    03100         ENDC
FAB8 DD   76        03200         STD     STORE    * save it for later
FABA 1F   50        03300         TFR     PC,D     * our ram location into D
FABC C3   000F      03400 OS1     ADDD    #GETLEN-OS1     * offset to Getlen sub
                    03500         COND    DB10-DBFLAG
                    03600         STD     $C8A2    * hook it in D-Basic 1.0
                    03700         LDX     #$C28E   * point X at 'BAS' ext
                    03800 READY   JSR     $C88A    * let D-Basic 1.0 process f/n
                    03900         ENDC
                    04000         COND    DB11-DBFLAG
FABF FD   C950      04100         STD     $C950    * hook it in D-basic 1.1
FAC2 8E   C2A6      04200         LDX     #$C2A6   * point X at 'BAS' ext
FAC5 BD   C938      04300 READY   JSR     $C938    * let D-Basic 1.1 process f/n
                    04400         ENDC
                    04500         COND    DB10-DBFLAG
                    04600         JMP     $C9BE    * let D-basic 1.0 load/run f/n
                    04700         ENDC
                    04800         COND    DB11-DBFLAG
FAC8 7E   CA6C      04900         JMP     $CA6C    * let D-basic 1.1 load/run f/n
                    05000         ENDC
                    05100 ***     D-Basic will JSR back to here while processing
                    05200 ***     D-basic's f/n routine checks for a valid
                                  variable.  Upon exit X= location:B= length
FACB DC   76        05300 GETLEN  LDD     STORE    * D-basic normal jsr address
                    05400         COND    DB10-DBFLAG
                    05500         STD     $C8A2    * remove my hook in 1.0
                    05600         ENDC
                    05700         COND    DB11-DBFLAG
FACD FD   C950      05800         STD     $C950    * remove my hook in 1.1
                    05900         ENDC
FAD0 CE   02DC      06000         LDU     #$2DC    * input buffer. f/n is here
FAD3 34   40        06100         PSHS    U        * save f/n start
FAD5 5F             06200         CLRB             * now get length in B
                    06300                          * & strip any operator tokens
```

Protect and highlight your important magazine collection with sturdy RAINBOW binders

RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE
RAINBOW
Co Power!

Distinctive, Durable RAINBOW Binders

THE RAINBOW is a vital resource to be referred to again and again. Keep your copies of THE RAINBOW safe in our quality, distinctive binders that provide complete protection.

These **attractive red vinyl binders** showcase your collection and ensure your RAINBOWS are in mint condition for future use. Each binder is **richly embossed with the magazine's name in gold** on the front and spine. They make a handsome addition to any room.

Put an End to Clutter

Organize your workspace with these tasteful binders. Spend more time with your CoCo and eliminate those frustrating searches for misplaced magazines.

A set of two binders, which holds a full 12 issues of THE RAINBOW, is only $13.50 (plus $2.50 shipping and handling).

Special Discounts on Past Issues

To help you complete your collection of THE RAINBOW, we're offering a **special discount on past issues** of the magazine.

When you place an order for six or more back issues of THE RAINBOW at the same time you order binders, you are entitled to $1 off the regular back issue price. To order, please see the "Back Issue Information" page in this issue.

Know Where to Look

You may purchase the "Official And Compleat Index To THE RAINBOW" for $1 when you purchase a set of binders. This comprehensive index of RAINBOW's first three years (July 1981 through July 1984) is usually priced at $2.50.

……

For greater convenience, order RAINBOW Binders through the shopping area of the CoCo SIG of Delphi!

_____ **YES**. Please send me _______ set(s) of RAINBOW binders

Take advantage of these special offers with your binder purchase:

_____ Save $1 off the single issue cover price for back issues. Minimum order of 6 magazines. Please enclose a back issue order form from a recent issue indicating magazines wanted.

_____ Purchase the "Official and Compleat Index to THE RAINBOW" for $1. (Regular price $2.50.)

(These offers good only with the purchase of a RAINBOW binder set)

Name ____________________
Address ____________________
City ____________________ State __________ ZIP __________
☐ My check in the amount of _______ is enclosed. (In order to hold down costs, we do not bill.)

Charge to: ☐ VISA ☐ MasterCard ☐ American Express

Account Number ____________________ Expiration Date __________
Signature ____________________

Mail to: **Rainbow Binders, The Falsoft Building, P.O. Box 385, Prospect, KY 40059.**

Binders are $13.50 per two-binder set plus $2.50 shipping and handling. If your order is to be sent via U.S. mail to a post office box or foreign country, please add $2. Kentucky residents add 5% sales tax. U.S. currency only, please. In order to hold down non-editorial costs, we do not bill.

For credit card orders call (800) 847-0309, 8 a.m. to 5 p.m. EST
All other inquiries call (502) 228-4492.

```
FAD6 A6    C0         06400 COUNT   LDA     ,U+      * get a byte from the input
FAD8 27    1B         06500         BEQ     FNEND    * 0 byte is end of buffer
FADA 5C               06600         INCB             * not end. add 1 to count
FADB 85    80         06700         BITA    #128     * test bit 7
FADD 27    F7         06800         BEQ     COUNT    * clr! not a token
FADF 1F    51         06900         TFR     PC,X     * where are we in ram?
FAE1 30    89 001A    07000 OS2     LEAX    TABLE-OS2,X     * X has Table address
FAE5 A1    81         07100 T1      CMPA    ,X++     * match token side of table?
FAE7 27    06         07200         BEQ     T2       * yes.
FAE9 6D    84         07300         TST     ,X       * end of table?
FAEB 26    F8         07400         BNE     T1       * no. keep looking
FAED 20    09         07500         BRA     ERROR    * not in the table
FAEF A6    82         07600 T2      LDA     ,-X      * X-1.  byte from ascii side
FAF1 A7    5F         07700         STA     -1,U     * replace token in buffer
FAF3 20    E1         07800         BRA     COUNT    * keep checking input buffer
FAF5 35    10         07900 FNEND   PULS    X        * f/n start in X for D-basic
FAF7 39               08000         RTS              * let D-basic cont. f/n ck
FAF8 7E    B277       08100 ERROR   JMP     $B277    * syntax error
                      08200 ***             1st byte of each double byte is token
                                            value of the operator.  2nd byte is the
                                            ascii value
FAFB       8327       08300 TABLE   FDB     $8327    * '
FAFD       AB2B       08400         FDB     $AB2B    * +
FAFF       AC2D       08500         FDB     $AC2D    * -
FB01       AE2F       08600         FDB     $AE2F    * /
FB03       AF5E       08700         FDB     $AF5E    * ^
FB05       AD2A       08800         FDB     $AD2A    * *
FB07       B23E       08900         FDB     $B23E    * >
FB09       B43C       09000         FDB     $B43C    * <
FB0B       00         09100         FCB     0        * end of table flag
           0000       09200         END

00000 TOTAL ERRORS
```

EZRun if reached from within a running BASIC program line.

EZRun is limited to filenames that do not begin with a reserved word. The filename `POKER` won't work. BASIC matches the reserved word `POKE` and changes it to a single byte token (146). While executing the input, BASIC jumps to the `POKE` routine instead of `LET`. Of course you can't `POKE R` so a Syntax Error is returned from the `POKE` routine.

This can be handled in two ways. You can use the old methods of typing `RUN "POKER"/LOAD "POKER",R` or rename problem files with the prefix X, for example, `XPOKER`. Since CoCo doesn't have any reserved words beginning with X this will force the interpreter to execute the `LET` routine and allow *EZRun* to step in.

I hope these enhancements make CoCoing as user friendly for you as they have me.

(Questions or comments regarding this utility may be directed to the author at 7 Ladd Road, Westfield, PA 16950. Please enclose an SASE when requesting a reply.) ☐

Listing 2: EZRUN

```
0 '*** Copyright (C) 1988
1 'COPYRIGHT 1989  FALSOFT,INC
2 '***    Kolesar B/S
4 '***    7 Ladd Road
6 '***    Westfield, PA. 16950
8 GOSUB90:RESTORE ' go check dat
a. return if ok!
10 '* read/data palette command
  (COCO 3 ONLY)
12 FORF=0TO15:READC:PALETTEF,C:N
EXT:DATA18,0,9,36,38,27,45,38, 0
,18,0,63,54,0,36,27
14 WIDTH 80:CLS2 ' (COCO 3 ONLY)
16 ATTR 3,1 ' (COCO 3 ONLY)
18 VERIFY ON
20 IFPEEK(49474)><48THENDB=1:' d
isk basic 1.1  if ><48
22 POKE 150,40 'set printer baud
 at 1200
24 IFDB=1THEN POKE55318,20:POKE5
5232,0 ELSEPOKE55075,20:POKE5498
9,0 'set 6ms step rate
26 IFDB=1THEN POKE55180,18:POKE5
5181,18:POKE55182,18 ELSEPOKE549
37,18:POKE54938,18:POKE54939,18
'nop second delay loop
28 POKE 44014,PEEK(2394)+48 :POK
E 44015,62 ' new prompt 0>
30 POKE 44016,32 ' replace carri
age return after new prompt
32 '* patch DRIVE command
34 IFDB=1THEN POKE52942,126:POKE
52943,0:POKE52944,243 ELSEPOKE52
722,126:POKE52723,0:POKE52724,24
3 'jmp  243
36 POKE 243,247 :POKE 244,9 :POK
E 245,90 ' stb  2394
38 POKE 246,203 :POKE247,48 ' ad
db #48
40 POKE 248,247 :POKE249,171 :PO
KE 250,238 ' stb 44014
42 POKE 251,192 :POKE 252,48 ' s
ubb #48
44 POKE 253,57 ' rts
46 '* patch PCLEAR command
48 POKE 38543,33 :POKE 38563,33
'pclear0  brn f/c error
50 '
52 POKE 41598,19 ' change <BREAK
> to equal <SH>-<@>
54 POKE41591,95 ' change <SHF>-<
SPACEBAR> to equal <SHF>-<^>
56 '* patch LET for Autorun enha
ncement
58 '* to relocate patch change l
ine 60.  variable 'A' is the sta
rt location of the patch, 'B' is
 start+length of the patch.  ('A
=&HFAA0' to 'A=&H new address').
  Also match data in line 74 to
the new address
60 A=&HFAA0:B=A+&H6B:GOSUB76
62 IFDB><1THENPOKEA+22,200:POKEA
+23,162:POKEA+32,200:POKEA+33,16
2:POKEA+36,142:POKEA+38,200:POKE
```

```
A+39,138:POKEA+41,201:POKEA+42,1
90:POKEA+46,200:POKEA+47,162:' p
atch Autorun for 1.0 D-basic
64 A=&HAF90:B=A+&H02:GOSUB76:END
66 DATA E1,9F,00,A6,26,02,0E,9F,
     D6,68,5C,26,4B,86,03,B7,09,
     59,F7,09,5E,FC,C9,50,DD,76,
     1F,50,C3,00,0F,FD,C9,50,8E,
     C2
68 DATA A6,BD,C9,38,7E,CA,6C,DC,
     76,FD,C9,50,CE,02,DC,34,40,
     5F,A6,C0,27,1B,5C,85,80,27,
     F7,1F,51,30,89,00,1A,A1,81,
     27
70 DATA 06,6D,84,26,F8,20,09,A6,
     82,A7,5F,20,E1,35,10,39,7E,
     B2,77,83,27,AB,2B,AC,2D,AE,
     2F,AF,5E,AD,2A,B2,3E,B4,3C,
     00
72 '* line 74 is M/L for  JSR  $
FAA0
74 DATA BD,FA,A0
76 FORF=A TO B:READH$:POKEF,VAL(
"&H"+H$):NEXT:RETURN
89 '* error check data lines
90 FORF=0TO15:READA:NEXT ' read
data past the palette settings (
COCO 3 ONLY)
91 B=36:C=4117:L=66:GOSUB95 '
data check line 66
92 C=4274:L=68:GOSUB95          '
data check line 68
93 C=3724:L=70: '    data check l
ine 70
94 '* Fall to line 95. Return to
 line 8 if data is ok. Error mes
sage if not.
95 E=0:FORF=1TOB:READH$:E=E+VAL(
"&H"+H$):NEXT:IFE><C THENPRINT"D
ATA ERROR IN LINE"L:END ELSE RET
URN
```

Corrections

"Doctor ASCII"(February 1989, Page 99): The address given for Merle Kemmerly, author of *Telstar 3.2*, is an old one. His current address is:

Merle Kemmerly
150 S. Atlanta St., Apt. 24S
Roswell, GA 30075

"High Capacity Screen Dumps, Part 1"(May 1989, Page 100): We have been informed of several corrections and clarifications for this article by H. Allen Curtis. They are as follows:

1) Page 101, Column 2, first full sentence: Change the name `DESKTOPH` to `DESKTOPL`.
2) Page 101, Column 2, third full paragraph: Change the phrase "if you have made" to "including."
3) Page 101, Column 3, third full paragraph: You must preceed the insert indicated in the last sentence with a comma in Line 740 of the program. In other words, insert `,CHR$(27);CHR$(15)`.
4) Page 103, Column 2, third full paragraph: Change the phrase "there's no need to" to "you must now."
5) Page 103, Column 3, second full paragraph: Replace the second and third sentences with:

Save the second screen as previously, but this time use the filename `DUMPL2`. Repeat the process used to obtain the second file and save the third screen as `DUMPL3`.

"CoCo Does Windows and a Whole Lot More"(March 1989, Page 100): There is a minor bug in the demo program (*Tic-Tac-Toe*) that causes it to think a move has been made if you open a window over the game and then click to close the window. To correct this, change lines 690, 760, 880 and 980 to:

```
GOSUB 13000:CX=-1:CY=-1:GOTO 560
```

"A Patch for a Patch"(February 1989, Page 80): As published, the patches to *Super Patched EDTASM* to allow the use of the CoCo 3's Hi-Res screens work only with Disk BASIC 1.0. Users of Disk BASIC 1.1 will appreciate the following corrections. If you are starting from scratch and have the source code from the September 1983 issue, make the changes to those lines shown in the following table:

Line	DOS 1.0	DOS 1.1
149	$CEA2	$CF7E
172	$CF07	$CFE3
258	$CA3B	$CAE9
298	$C8A4	$C952
321	$C468	$C48D
392	$CBD2	$CCAC

Alternatively, if you want to use the `SPATCH` program included on the February 1989 RAINBOW ON DISK, follow the steps below:

1) Insert *EDTASM* ROM Pak and turn on the CoCo.
2) At the prompt, press Z and ENTER.
3) Type `U C000 1000 27FF` and press ENTER.
4) Put a fresh tape in the cassette recorder, press Play and Record.
5) Type `P EDTASM 1000 37FF 1000` and press ENTER.
6) Turn the CoCo off, plug in the disk controller and power machine back up.
7) Copy `SPATCH` (from the February 1989 RAINBOW ON DISK) to a fresh disk.
8) Enter `CLOADM"EDTASM` and save it to disk using; `SAVEM "EDTASM",&H1000,&H37FF,&H1000`.
9) Enter and run the following program:

```
0 PCLEAR8:WIDTH32:GOTO10
1'*****COPYRIGHT 1988 RANDALL R
EID
5 SAVE"DOSPATCH":END
10 LOADM"EDTASM":LOADM"SPATCH"
20 FORA=0TO5:READ A$,B$,C$:POKE
VAL("&H"+A$),VAL"H"+B$):POKE V
AL("&H"+A$)+1,VAL("&H"+C$):NEXT
30 DATA 16CD,CF,7E,1654,CF,E3,0E
30,CA,E9,0E7E,C9,52,0EB1,C4,8D,0
F55,CC,AC
40 SAVEM"ED+/BIN",&H0E00,&H37FF,
&H0E00
50 END
```

Use our 800 number!

For credit card orders, you may want to phone in your subscription. Our *credit card order* number is (800) 847-0309, 8 a.m. to 5 p.m. EST. All other inquiries please call (502) 228-4492.

We accept VISA, MasterCard and American Express.

Subscriptions to **THE RAINBOW** are $31 a year in the United States. Canadian rate is $38 (U.S. funds only). Surface rate elsewhere is $68 (U.S.). Airmail is $103 (U.S.). All subscriptions begin with the current issue. Please allow 6 to 8 weeks for the first copy. Kentucky residents add 5% sales tax.

In order to hold down non-editorial costs, we do not bill.

Our 800 number is also good for ordering RAINBOW ON TAPE or RAINBOW ON DISK!

Just call (800) 847-0309 anytime from 8 a.m. to 5 p.m. EST. *Credit card orders only.* Subscriptions to **RAINBOW ON TAPE** are $80 a year in the United States, $90 (U.S. funds) in Canada and $105 (U.S.) in all other countries.

RAINBOW ON DISK is $99 a year in the United States, $115 (U.S.) in Canada and $130 (U.S.) in all other countries.

Individual issues of **RAINBOW ON TAPE** are $10 in the U.S., $12 (U.S.) in Canada and all other countries. Individual issues of **RAINBOW ON DISK** are $12 in the U.S., $14 (U.S.) in Canada, and $16 (U.S.) in all other countries. Kentucky residents please add 5% sales tax.

RAINBOW ON TAPE and **RAINBOW ON DISK** are not stand-alone products; you need the magazine for loading and operating instructions and the necessary documentation. **THE RAINBOW** magazine is a separate purchase.

Send Me Rainbow Magazine!

Which Tandy Color Computer do you use? ☐ CoCo 1 ☐ CoCo 2 ☐ CoCo 3

Here's your chance to have a Pot O' Gold full of programs, articles and information about CoCo every month of the year!

As the premier magazine for the Tandy Color Computer, **THE RAINBOW** has more of everything — and greater variety, too. Do yourself and your CoCo a favor and subscribe to **THE RAINBOW** today!

YES! Sign me up for a year (12 issues) of **THE RAINBOW.**

☐ *NEW* ☐ *RENEW (attach label)*

Name ______

Address ______

City ______ *State* ______ *ZIP* ______

☐ Payment Enclosed (payment must accompany order)

Charge: ☐ VISA ☐ MasterCard ☐ American Express

Account Number ______

Signature ______ Card Expiration Date ______

Give Your Fingers A Break!

YES! Sign me up: ☐ *NEW* ☐ *RENEW (attach label)*

☐ *RAINBOW ON TAPE* ☐ *RAINBOW ON DISK (Available beginning with the October 1986 issue)*

☐ *A Full Year* ☐ *Single Issue (specify month & year)* ______

Name ______

Address ______

City ______ State ______ ZIP ______

☐ Payment Enclosed (payment must accompany order)

Charge: ☐ VISA ☐ MasterCard ☐ American Express

Account Number ______

Signature ______ Card Expiration Date ______

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 1 PROSPECT, KY

POSTAGE WILL BE PAID BY ADDRESSEE

The RAINBOW®
THE COLOR COMPUTER MONTHLY MAGAZINE
The Falsoft Building
P.O. Box 385
Prospect, KY 40059-9989

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 1 PROSPECT, KY

POSTAGE WILL BE PAID BY ADDRESSEE

The RAINBOW®
THE COLOR COMPUTER MONTHLY MAGAZINE
The Falsoft Building
P.O. Box 385
Prospect, KY 40059-9989

The Biggest
The Best
The Indispensable

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE

THE RAINBOW is the biggest, best, brightest and most comprehensive publication a happy CoCo ever had! **THE RAINBOW** features more programs, more information and more in-depth treatment of the Tandy Color Computer than any other source.

A monthly issue contains nearly 200 pages and up to two dozen programs, 14 regular columns and as many as 12 new product reviews. And advertisements: **THE RAINBOW** is known as *the* medium for advertisers — which means every month it has a wealth of information unavailable anywhere else about new products! Hundreds of programs are advertised in its pages each month.

Every single issue of **THE RAINBOW** covers the wide spectrum of interests in the Tandy Color Computer — from beginners' tutorials and arcade games to telecommunications and business and finance programs. Helpful utilities and do-it-yourself hardware projects make it easy and fun to expand your CoCo's capabilities. And, monthly reviews by independent reader reviewers take the guesswork out of buying new software and hardware products.

Join the tens of thousands who have found **THE RAINBOW** to be an absolute necessity for their CoCo. With all this going for it, is it surprising that more than 90 percent of **THE RAINBOW** subscribers renew their subscriptions? We're willing to bet that, a year from now, you'll be doing the same.

Rainbow On Tape
& Rainbow On Disk!

— great ways to bring **THE RAINBOW** into your life. Each month, all you do is pop the tape into your cassette player or the disk into your drive. No more lost weekends. As soon as you read an article about a program in **THE RAINBOW**, it's ready to load and run. No work. No wait.

Just think how your software library will grow. With your first year's subscription, you'll get almost 250 new programs: games, utilities, business programs, home applications. And, with **RAINBOW ON DISK**, you'll also get all the OS-9 programs.

RAINBOW ON TAPE and **RAINBOW ON DISK** — they're the "meat" of **THE RAINBOW** at a price that's "small potatoes." And now you even have a choice about how it should be served up to you.

To get your first heaping helping, just fill out and return the attached reply card. No postage necessary.

RASCAN

VIDEO DIGITIZER

The Rascan Video Digitizer is a state-of-the-art image processing system designed to take advantage of your Color Computer 3's graphic capabilities.

The Rascan Video Digitizer connects easily to any color or black & white video camera, video recorder or video disc player and captures images with precision accuracy.

Why settle for a 256 x 256 image area when the Color Computer can display so much more? We asked that question ourselves. Our only answer was to provide an *image area of 640 x 200 and 320 x 200!* Say good-bye to those useless lo-resolution images created by other digitizers on the market.

Life is not simply black & white, that's why we added living color to our Digitizer. Now, through the use of advanced programming techniques, 512K Color Computer 3 owners can capture images from their video camera and display them in *4096 Super Hi-Resolution graphics!*

Capture images effortlessly. Simply select the image capture option and turn your Rascan unit on. Within seconds your image will be captured and displayed on your screen. Images can be fine tuned by use of the contrast and brightness knobs found on the Rascan unit.

Rascan also features a *professional pop-up menu system* which will allow for easy palette manipulation and color painting of captured images.

The Rascan Video Digitizer *comes complete with Rascan driver software, an easy to read manual, sample graphic images disk and print driver disk* (supporting most printers). Although no further graphic editors are necessary to produce quality images, Rascan images can be easily loaded into ColorMax and CoCo Max graphic editors.

Whether your interests are in desk-top publishing, report generation or simply for fun, the Rascan Video Digitizer will provide you with images of near photographic quality!

FEATURES	RASCAN YES	RASCAN NO	DS-69b YES	DS-69b NO
Support of 640 x 200 16 Level Grey Images	X			X
Support of 640 x 200 4 Level Grey Images	X			X
Support of 320 x 200 16 Color Images	X			X
Support of 4096 Hi-Res Color Graphics in 512K mode	X			X
Support of Multiple Image Buffers in 512K mode	X			X
Control of Contrast & Brightness via Control Knobs found on Digitizer	X			X
Professional, Easy to Use Pop-Up Menu System	X			X
Designed Exclusively to Take Advantage of the power of the Color Computer III	X			X
Built in Histograph Utility to Aid in Image Quality	X			X
Easy to use Paint and Palette editing, no need for additional Graphic editors	X			X
15 Day Full Money Back Guarantee	X			X
Interface through Joystick Ports	X			X
Requires additional cost of Y-Cable or Multi-Pak interface		X	X	

THE RASCAN VIDEO DIGITIZER

$159^{95}

NO RISK GUARANTEE

If you are not completely satisfied with the performance of your Rascan Video Digitizer, you may return it, undamaged within fifteen days for the full refund of the purchase price plus shipping costs.

GAME POINT SOFTWARE

P.O. Box 6907, Burbank, CA 91510-6907
(818) 566-3571 • BBS: (818) 772-8890
Toll Free: 800 877-2232 ext. 139

MasterCard VISA DISCOVER AMERICAN EXPRESS

Personal checks, money orders, and American C.O.D. orders accepted. Include $3.00 for S/H. $2.50 extra for C.O.D. orders. (Cal. res. add 6.5% tax.)
ATTENTION PROGRAMMERS: Game Point Software is looking for talented writers. Top royalties guaranteed.

16K ECB

The twelfth in a series of tutorials for the beginner to intermediate machine language programmer

Machine Language Made BASIC Part XII: And the Music Played On

By William P. Nee

This month we'll use many of the machine language routines discussed in previous articles to create a music program that plays six voices (notes) simultaneously, and lets you change the timbre of the notes to create different sounds. First, let's decide what to put in the program and how to do it. Trying to make this as much like the `PLAY` command as possible, I suggest using the following values:

Note (C - B) with a sharp (#) or flat (-)
Octave (1 - 5)
Tempo (1 - 5)
Length: 1 = whole note (#$80)
2 = half note (#$40)
3 = quarter note triplet (#$15)
4 = quarter note (#$20)
5 = thirty-second note (#$4)
6 = sixteenth note (#$8)
7 = eighth note triplet (#$A)
8 = eighth note (#$10)
*9 = sixty-fourth note (#$2)
Rest

*Use for separating like notes or playing grace notes.

Since there are no graphics for this program, start it very low in memory to give plenty of room for each chord. Set Location $FF/100 to #$E00 and `ORG` at $2000. Reserve one memory byte for a note counter (`NOTECT RMB 1`) and load it with #6, since there are six notes in each chord. Reserve one memory byte each for Tempo, Length, Octave and temporary Octave 1. Chord information is put in as `FCC` lines. Once you set the Octave, Tempo and Length, you do not need to re-enter them unless they change.

Label the start of the notes as `NTABLE`, remembering that using `FCC` lines enters the character's ASCII number (A = #$41, 1 = #$31, etc.). (*EDTASM+* only allows 250 characters per `FCC` line.) You can also number the `NTABLE`(s) for easy reference or corrections at each stanza, movement, page, etc.

The vocabulary check pauses or "reads" each chord. First, load Register X with the location of the `NTABLE` (`LDX #NTABLE`). Register X will now always contain the current chord location in the `NTABLE`. Load Stack U with the location $4100, where the numerical value of each note is stored and saved. Load Register A with the contents of Register X (get the first character in the note chord) and increase Register X by one (`LDA ,X+`).

Is the first character an R? If not, go to the next check. If it is a Rest, load Register

The Listing: `6VOICES`

```
                     00050 *              $FF/100=#$E00
2000                 00100          ORG   $2000
2000 CE   4100       00110 START    LDU   #$4100  START OF FIRST CHORD
2003 8E   2111       00120          LDX   #NTABLE
2006 C6   06         00130 CHORD    LDB   #6      SIX NOTES TO THE CHORD
2008 F7   2461       00140          STB   NOTECT
200B A6   80         00150 VOC      LDA   ,X+     GET THE FIRST CHARACTER
200D 1027 0FEF       00160          LBEQ  PLAYER  IF IT'S ZERO THATS ALL
2011 81   3B         00170          CMPA  #';
2013 27   F6         00180          BEQ   VOC     PASS OVER A ";"
2015 81   52         00190 REST     CMPA  #'R     IS IT A REST
2017 26   16         00200          BNE   TEMP
2019 FC   2462       00210          LDD   TEMPO   GET THE TEMPO AND LENGTH
201C ED   C1         00220          STD   ,U++    THEY START EACH CHORD
201E CC   0000       00230          LDD   #0      FILL IN SIX ZERO NOTES
2021 ED   C1         00240          STD   ,U++
2023 ED   C1         00250          STD   ,U++
2025 ED   C1         00260          STD   ,U++
2027 ED   C1         00270          STD   ,U++
2029 ED   C1         00280          STD   ,U++
202B ED   C1         00290          STD   ,U++
202D 20   D7         00300          BRA   CHORD
202F 81   54         00310 TEMP     CMPA  #'T     IS IT TEMPO
2031 26   0C         00320          BNE   LEN
2033 A6   80         00330          LDA   ,X+
2035 80   30         00340          SUBA  #$30    GET THE TEMPO NUMBER
2037 C6   14         00350          LDB   #20     FOR DIFFERENT TEMPOS
2039 3D              00360          MUL
203A F7   2462       00370          STB   TEMPO
203D 20   CC         00380          BRA   VOC
203F 81   4C         00390 LEN      CMPA  #'L     IS IT LENGTH
2041 26   0F         00400          BNE   OCT
2043 A6   80         00410          LDA   ,X+
2045 80   30         00420          SUBA  #$30    GET THE LENGTH NUMBER
2047 108E 2436       00430          LDY   #LTABLE
```

Bill Nee buked the "snowbird" trend by retiring to Wisconsin from a banking career in Florida. He spends the long, cold winters writing programs for his CoCo.

The New OWL-Ware Floppy Drive System

No Better System is Available at Any Price (But the Price is Great, too!)

WINDOW WRITER NOW AVALIABLE! (Described in February Rainbow)

DISK CONTROLLER

We at OWL-WARE are pleased to announce that we have purchased the rights to all of the Color Computer Products of J&M Systems. J&M has had more experience with CoCo controllers than any other supplier (except for Radio Shack® itself) and we are proud to add them to our nest! OWL-WARE will now be producing J&M controllers under the OWL brand. These controllers all use J&M's proven designs, with some minor improvements, and they will serve you for years to come.

- All gold contacts
- Works with all CoCo models (1,2,3)
- Holds 2 switchable ROMS
- Positive switching by simple jumper or optional external switch (No erratic software or pokes required)
- Buffered I/O lines to help prevent burn-out if unit accidentally pulled out with the system on
- Latching chips are socketed to speed repairs
- Does not use the WD1773 chip which caused problems with many CoCo 3 systems and is now discontinued
- Attractive all metal case
- Dealer inquiries now invited

CONTROLLER only $69.
(without ROMs)

(Add $14.95 for RSDOS
$19.95 RSDOS and
OWLDOS)

See the next 2 pages for more drive and software specials from OWL-WARE

COMPUTER
CAUTION
TURN OFF POWER BEFORE
REMOVING OR INSERTING
OWL CONTROLLER
DISC DRIVE
OWL
DRIVE SYSTEM

Disk drives are not our only business, but they sure are our main business! We have been selling hard and floppy drives for the CoCo longer than any other Rainbow advertiser. **Our double sided drives are brand new, half-heights with a full one year warranty!** The full-height drives offered cheap by our competition are *used or surplus!*

QUICK FLASH!! Announcing the Most Advanced Color Computer 3 Word Processor Ever!

WINDOW WRITER

Window Writer is the first word processor which takes full advantage of OS/9. The result is a word processor which is as modern and professional in action as those previously available only for the IBM and Mac. Allows multi-taking with other programs or itself. Pull down menus and detailed help screens make learning easy and are only a key stroke (or mouse click) away. Can be user configured for everything including menu colors and contents. See the February Rainbow for preview of the early version. **Requires 80 column monitor.**

Available now at a special introductory price of:

$49. until May 15. Normal price $59.

(Ask about combo with spelling checker available for $20)

CASE AND POWER SUPPLY

In recent months it has become very difficult to obtain dependable, safe power supply and cases for floppy drive systems. They just couldn't pass our quality control. OWL-WARE has now produced a case and power supply that you can be proud to own and use. We believe that this is the best and most attractive drive case available for any computer.

- Built in surge protector! (we believe that this feature is unique in CoCo drive cases)
- Sleek, modern design
- Heavy-duty power supply
- Fully shielded data cable
- Modular power supply construction for ease of repairs
- Stackable case design
- Dealer inquiries now invited

SPECIAL WINTER SALE
Double Sided Drives
Drive 0 System
Complete $199.
Drive 1

More ⇨

OWL-WARE
P.O. Box 116-A
Mertztown, PA 19539
— ORDER LINES (only) —
(800) 245-6228
(215) 682-6855 (PA)

OWL-WARE

Proven

On the Razor's Edge of

Basic and OS-9 Hard Drive Systems

Proven Performance for Demanding Home or Business Users

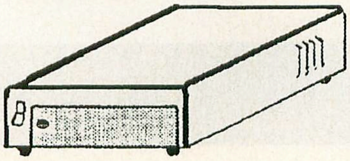
Every hard drive which has been produced by OWL-WARE during the last 3 years is **complete**. A system consists of software, hard drive, controller, heavy-duty power supply, and LR Tech Interface. There are no hidden costs for assembly or testing. When a drive system is ordered, we fully **assemble**, **test**, and **burn-in** the system for 3 full days. This ensures dependability and optimum performance.

We have now been supplying CoCo hard drive systems and parts for more than 3 years. This is the longest history in the CoCo market of any system. Some other advertisers are stating that they have one of the most reliable systems for the CoCo *with all of 4 months history in the CoCo hard drive market*! We have reached our position in the hard drive market by providing our customers with a quality product that they (and we) can be proud to own and use.

Because of many requests for a lower price system in kit form, we are now selling a kit of all parts at a significant discount compared to our regular prices. We recommend this kit (or any kits offered by any other supplier) only to those who have experience in electronic assembly and OS-9.

We have **LR Tech** and **Burke & Burke**

For OS-9 Levels 1 and 2



	10 Meg.	20 Meg.	40 Meg.	80 Meg. (2 X 40 Meg.)
System Prices: (Includes Hard Drive, Controller, LR Tech Interface, Software. Fully assembled and tested.)	$469.	$599.	$725.	$1,069.
Kit Prices: (LR Tech System as above but not assembled or tested.)	$419.	$549.	$659.	$ 999.
Kit Prices: (As above but using Burke & Burke bus adapter)	(na)	$489.	$609. (lower prices)	

30 Meg Kit: $539. (Lowest prices anywhere)

OWL Hard Drive BASIC 3

There have been several ads in this magazine about BASIC for Color Computer hard drive systems. These ads sometimes only tell a part of the story. Our BASIC system price includes **assembly**, **testing**, and **3-day burn-in** period. We do not require a Multi-pak to operate.

Our hard drive systems are fast, reliable, and reasonable in price. This has been proven by hundreds of users over the past 3 years. We do not have to turn off error checking for speed. We achieve high speed BASIC from a unique indexing method.

The table below will summarize some of the key points about our BASIC hard drive system and the B&B system. We believe that we have the best BASIC interface for CoCo hard drives available.

BASIC Hard Drive Systems*

Feature	OWL	B&B
Drive Portion Available at One Time	Entire	Partial (4 sections)
User Sets BASIC/OS-9 Partitions	YES	Yes
Add to Existing OS-9 Drive Without Reformat	YES	No(?)
Drives 0-3 Hard/Floppy	YES	No
Built in Park	YES	No
Speed*	FAST	Fast

*All feature details are believed to be true at time of writing and are subject to change. We believe that our BASIC hard drives are the fastest due to our indexing method, but both systems are fast and we sell both. On ours all BASIC commands work including DSKINI, DSKI$, and DSKO$.

Prices: With/Without Hard Drive

$35./$79.

Technology
the Color Computer Frontier

DISK DRIVES

Bonus!
Special
Bundled
Software
with any
Disk Drive
Purchase!

Floppy Drive Systems

The Highest Quality for Years of Service

(We have located a number of unused, surplus single sided drives for those who wish a quality, inexpensive system.)

Drive 0 Systems (Half Height, Double Sided, Direct Drives) $199. (Same but Single sided) $185

Drive 0 systems complete with drive, controller, legal DOS, cable, case, power supply, and manual

Drive 1 Systems (Half Height, Double Sided, Direct Drives) $129. (Same but Single sided) $115.

New 3.5", 720K Drives for OS-9 with case & Power Supply $179.

Drive 1 Systems have drive, case, power supply. (You may require optional cable and/or DOS chip to use)

Special for 0/1 Combos (Drives 0,1,2,3) $295.

HALF- HEIGHT DRIVE UPGRADES FOR RS HORIZONTAL CASES

Why only double the capacity of your system when you can triple in the same case? Kit includes: double-sided to fit your case, chip to run both sides of new drive, hardware, and detailed instructions. Easy! Takes only 5 minutes!

Model $119. Model $129.
500 501 or 502

All drives are new and fully assembled. We ship only FULLY TESTED and CERTIFIED at these low prices. We use Fuji, YE Data, and other fine brands. No drives are used or surplus unless otherwise stated to you when you order. We appear to be the one of the few advertisers in Rainbow who can truly make this claim. We have 5 years experience in the CoCo disk drive market! We are able to provide support when you have a problem.

Drives 1 Year Warranty

OWL Phones

Order Numbers (only)
1-800-245-6228
1-215-682-6855

Technical Help
1-215-837-1917

OWL WARE Software Bundle

Disk Tutorial/Utilities/Games

DISK TUTOR Ver 1.1

Learn how to use your disk drive from this multi-lesson, machine language program. This tutor takes you through your lessons and corrects your mistakes for a quick, painless disk drive introduction. (This professionally written tutor is easily worth the bundle's total price.)

OWL DOS

An operating system that gives faster disk access and allows the use of double-sided drives. Corrects a floating point number error on early CoCo systems.

COPY-IT

Quickly copies selected programs between disks. A wild card option selects groups of programs to copy.

VERIFY

Verifies reading of each sector. Bad sectors are listed on the screen.

2 GAMES

We will select 2 games from our stock. These sold for more than $20 each.

If sold separately this is more than $125 worth of software!!

Do not mistake this software with cheap, non-professional "Public Domain" software which is being offered by others. All of this software is copyrighted and professional in quality. The tutor is unique with us and has helped thousands of new users learn their disk drive.

only $27.95
(or even better)
only $6.95 with
any Disk Drive Purchase!!

Our prices include a discount for cash but do not include shipping.

OWL-WARE has a liberal warranty policy. During the warranty period, all defective items will be repaired or replaced at our option at no cost to the buyer except for shipping costs. Call our tech number for return. Return of non-defective or unauthorized returns are subject to a service charge.

OWL-WARE
P.O. BOX 116
Mertztown, PA 19539

D with the current tempo, store it at Location U, and increase U by two. Then clear Register D, store it at Location U, and increase U by two. Do this five more times to get the six notes, and return to the vocabulary check. If the character is not T, go to the next vocabulary check; if it is, read the next character, which must be a number. Since it is in ASCII, subtract #$30 to get the actual number value; multiply this by 20 (just to get tempo changes) and store the result in `TEMPO`. Go back to the vocabulary check; if the character is not L, go to the next check; if it is, read the next character, which must be a number. Again, subtract #$30 to get the number value.

The actual note lengths are stored in `LTABLE`, so if you load Register Y with the `LTABLE` location and Register B with the A value in the table (`LDB A,Y`), Register B will then contain the actual note length. Go back to the vocabulary check; if the next character is not an O, go to the next check. If it is, read the next character, which must be a number. Subtract #$30 to get the number value (1 to 5) and store it in `OCTAVE`. Go back to the vocabulary check.

If the character isn't any of the above, it must be a note (C, D, E, F, G, A, B). First, increase the note location by two. Notes are always bytes 3 to 14, in our chord; the first two bytes are the tempo and length. Because there are 12 steps in an octave, convert a C to Note 1, D to Note 3, etc. The notes are in ASCII format so subtract #$41 to get a number value (A will = 0, B will = 1, etc.).

`CTABLE` gives the note number assigned to each letter (A is the 10th note, B is the 11th note, G is the 8th note, etc.). Load Register Y with the `CTABLE` location and load Register B with the A value (`LDB A,Y`) to get the actual note value (C=1, D=3, E=5, F=6, G=8, A=10 and B=12). Now, check the next character to see if it is a sharp (#) or flat (-); if it's a sharp, increase the note value by one (C#=2, F#=7, etc.); if it's a flat, decrease the note value by one (E-=4, B-=11, etc.). Don't use C- or B# as they will blow the program.

If the next character after the note is not a sharp or a flat, decrease the vocabulary location by one, back to it's previous location. Now convert the note to a value the computer can use to play it. First, decrease the note numbers one to 12 by one, to get numbers from zero to 11, then load the current `OCTAVE` into a temporary `OCT1`. Multiply the note number (zero to 11) by two.

The location `SCALE` contains the frequency for each note (zero to 11). Each frequency is two bytes - that's why we multiplied the note number by two. If we load Register Y with the scale location and

```
204B E6   A6       00440          LDB    A,Y     GET THE LENGTH VALUE
204D F7   2463     00450          STB    LENGTH
2050 20   B9       00460          BRA    VOC
2052 81   4F       00470 OCT      CMPA   #'O     IS IT OCTAVE
2054 26   09       00480          BNE    NOTE
2056 A6   80       00490          LDA    ,X+
2058 80   30       00500          SUBA   #$30    GET THE OCTAVE NUMBER
205A B7   245F     00510          STA    OCTAVE
205D 20   AC       00520          BRA    VOC
205F 33   42       00530 NOTE     LEAU   2,U     INCREASE CHORD LOCATION BY TWO
2061 80   41       00540          SUBA   #$41    GET THE LETTER COUNT
2063 108E 2440     00550          LDY    #CTABLE
2067 E6   A6       00560          LDB    A,Y     GET THE LETTER VALUE
2069 A6   80       00570          LDA    ,X+     CHECK FOR SHARP OR FLAT
206B 81   23       00580 CSHARP   CMPA   #'#     IS IT A SHARP
206D 26   03       00590          BNE    CFLAT
206F 5C            00600          INCB           INCREASE THE NOTE VALUE BY ONE
2070 20   09       00610          BRA    STORE
2072 81   2D       00620 CFLAT    CMPA   #'-     IS IT A FLAT
2074 26   03       00630          BNE    CDEC
2076 5A            00640          DECB           DECREASE THE NOTE VALUE BY ONE
2077 20   02       00650          BRA    STORE
2079 30   1F       00660 CDEC     LEAX   -1,X    IT WASN'T EITHER; DECREASE THE
LOCATION
207B 5A            00670 STORE    DECB           GET NOTE VALUE 0 - 11
207C B6   245F     00680          LDA    OCTAVE
207F B7   2460     00690          STA    OCT1    TEMPORARY OCTAVE
2082 86   02       00700          LDA    #2
2084 3D            00710          MUL
2085 108E 2447     00720          LDY    #SCALE
2089 EC   A5       00730          LDD    B,Y     NOTE FREQUENCY FOR OCTAVE 0
208B 7A   2460     00740 ROTATE   DEC    OCT1
208E 27   04       00750          BEQ    SAVE    OK IF IT'S OCTAVE 0
2090 58            00760          ASLB           IF NOT, DOUBLE THE FREQUENCY
2091 49            00770          ROLA
2092 20   F7       00780          BRA    ROTATE  NOW IS OCTAVE 0
2094 ED   C4       00790 SAVE     STD    ,U      STORE THE 2-BYTE FREQUENCY
2096 7A   2461     00800          DEC    NOTECT  ONE LESS NOTE TO GET
2099 27   18       00810          BEQ    LOOP    CHORD'S GOT ALL SIX NOTES
209B A6   80       00820          LDA    ,X+
209D 81   3B       00830          CMPA   #';
209F 27   06       00840          BEQ    FINISH  NO MORE NOTES IN THIS CHORD
20A1 81   4F       00850          CMPA   #'O     OCTAVE CHANGE?
20A3 27   AD       00860          BEQ    OCT
20A5 20   B8       00870          BRA    NOTE    MUST BE ANOTHER NOTE
20A7 CC   0000     00880 FINISH   LDD    #0
20AA 33   42       00890 CFIN     LEAU   2,U     FILL IN THE CHORD WITH ZEROS
20AC ED   C4       00900          STD    ,U
20AE 7A   2461     00910          DEC    NOTECT
20B1 26   F7       00920          BNE    CFIN    ALL DONE?
20B3 FC   2462     00930 LOOP     LDD    TEMPO   GET THE TEMPO AND LENGTH
20B6 ED   54       00940          STD    -12,U   PUT THEM AT START OF CHORD
20B8 33   42       00950          LEAU   2,U     START OF NEXT CHORD
20BA 16   FF49     00960          LBRA   CHORD
20BD      20       00970 TITLE    FCC    / * CHINESE SERENADE *
    BY                        HERMAN  FLIEGE/
210F      0D00     00980          FDB    $0D00
2111      54       00990 NTABLE   FCC    /T5L8O4DCO3AO2F#F#F#;O4DCO3ADCO2A;O4DCO
3AO2DDD;O4DCO3ADCO2A/
214B      4F       01000          FCC    /O4DO3B-GO2GGG;O4GO3DO2B-;O4DO3B-GO2DDD
;O4DO3B-GDO2B-;/
2180      4F       01010          FCC    /O4DCO3AF#F#F#;O4AO3DCO2A;O4DCO3AO2D;O4
DCO3ADCO2A;/
21B1      4F       01020          FCC    /O4DO3B-GO2G;O4B-O3DO2B-;O4DO3B-GO2D;O4
DO3B-GDO2B-;/
21E3      4F       01030          FCC    /O4DCO3AO2F#F#F#;O4DCO3ADCO2A;O4DCO3AO2
DDD;O4DCO3ADCO2A/
2219      4F       01040          FCC    /O4DO3B-GO2GGG;O4GO3DO2B-;O4DO3B-GO2DDD
;O4DO3B-GDO2B-;/
224E      4F       01050          FCC    /O4DCO3AO2F#F#F#;O5DO4DO3DCO2A;O5DO4DO2
D;O4F#DCO3DCO2A;/
2284      4F       01060          FCC    /O4GDO3B-DO2B-G;R;L4O5GO4GO2GO1G;/
22A4      4C       01070          FCC    /L8O4DCO3AO2F#F#F#;O4DCO3ADCO2A;O4DCO3A
O2DDD;O4DCO3ADCO2A/
22DC      4F       01080          FCC    /O4DO3B-GO2GGG;O4GO3DO2B-;O4DO3B-GO2DDD
;O4DO3B-GDO2B-;/
2311      4F       01090          FCC    /O4DCO3AF#F#F#;O4AO3DCO2A;O4DCO3AO2D;O4
DCO3ADCO2A;/
2342      4F       01100          FCC    /O4DO3B-GO2G;O4B-O3DO2B-;O4DO3B-GO2D;O4
DO3B-GDO2B-;/
2374      4F       01110          FCC    /O4DCO3AO2F#F#F#;O4DCO3ADCO2A;O4DCO3AO2
DDD;O4DCO3ADCO2A/
23AA      4F       01120          FCC    /O4DO3B-GO2GGG;O4GO3DO2B-;O4DO3B-GO2DDD
;O4DO3B-GDO2B-;/
```

```
23DF      4F        01130         FCC   /O4DCO3AO2F#F#F#;O5DO4DO3DCO2A;O5DO4DO2
D;O4F#DCO3DCO2A;/
2415      4F        01140         FCC   /O4GDO3B-DO2B-G;R;L4O5GO4GO2GO1G;/
2435      00        01150         FCB   0       END OF THE MUSIC
2436      0080      01160 LTABLE  FDB   $0080   NOTE LENGTHS
2438      4015      01170         FDB   $4015
243A      2004      01180         FDB   $2004
243C      080A      01190         FDB   $080A
243E      1002      01200         FDB   $1002
2440      0A0C      01210 CTABLE  FDB   $0A0C   NUMBER VALUES FOR NOTE LETTERS
2442      0103      01220         FDB   $0103
2444      0506      01230         FDB   $0506
2446      08        01240         FCB   $08
2447      02B6      01250 SCALE   FDB   $02B6   NOTE FREQUENCIES
2449      02DF      01260         FDB   $02DF
244B      030B      01270         FDB   $030B
244D      0339      01280         FDB   $0339
244F      036A      01290         FDB   $036A
2451      039E      01300         FDB   $039E
2453      03D6      01310         FDB   $03D6
2455      0410      01320         FDB   $0410
2457      044E      01330         FDB   $044E
2459      048F      01340         FDB   $048F
245B      04D5      01350         FDB   $04D5
245D      051E      01360         FDB   $051E
245F                01370 OCTAVE  RMB   1
2460                01380 OCT1    RMB   1
2461                01390 NOTECT  RMB   1
2462                01400 TEMPO   RMB   1
2463                01410 LENGTH  RMB   1
3000                01420         ORG   $3000
3000 6F   C4        01430 PLAYER  CLR   ,U      END THE MUSIC WITH ZEROS
3002 BD   A928      01440         JSR   $A928   CLS
3005 8E   20BD      01450         LDX   #TITLE
3008 CC   04E5      01460         LDD   #$4E5   PRINT @ LOCATION
300B DD   88        01470         STD   $88     INTO CURSOR LOCATION
300D BD   B99C      01480         JSR   $B99C   PRINT THE TITLE
3010 8E   30CB      01490 FILL    LDX   #TCURVE START OF TIMBRE CURVE
3013 CE   4000      01500         LDU   #$4000  WHERE TO STORE IT
3016 EC   81        01510 LOOP3   LDD   ,X++
3018 ED   C1        01520         STD   ,U++
301A 1183 4100      01530         CMPU  #$4100
301E 25   F6        01540         BLO   LOOP3
3020 34   01        01550         PSHS  CC
3022 1A   50        01560         ORCC  #$50    NO INTERRUPTS
3024 5F             01570         CLRB
3025 BD   A9A2      01580         JSR   $A9A2   SET SOUND ON
3028 BD   A976      01590         JSR   $A976
302B 86   3F        01600         LDA   #$3F    LOTS OF LOCATIONS AT $3F00 - $3
FFF
302D 1F   8B        01610         TFR   A,DP    SET THE DP REGISTER TO #$FF
302F 86   40        01620         LDA   #$40    START OF TCURVE LOCATION
3031 97   C0        01630         STA   $C0
3033 0F   C1        01640         CLR   $C1
3035 0F   C2        01650         CLR   $C2
3037 97   C3        01660         STA   $C3
3039 0F   C4        01670         CLR   $C4
303B 0F   C5        01680         CLR   $C5
303D 97   C6        01690         STA   $C6
303F 0F   C7        01700         CLR   $C7
3041 0F   C8        01710         CLR   $C8
3043 97   C9        01720         STA   $C9
3045 0F   CA        01730         CLR   $CA
3047 0F   CB        01740         CLR   $CB
3049 97   CC        01750         STA   $0CC
304B 0F   CD        01760         CLR   $CD
304D 0F   CE        01770         CLR   $CE
304F 97   CF        01780         STA   $CF
3051 0F   D0        01790         CLR   $D0
3053 0F   D1        01800         CLR   $D1
3055 108E 4100      01810 PLAY    LDY   #$4100  START OF CHORDS LOCATION
3059 6D   A4        01820 LOOP1   TST   ,Y      IS FIRST VALUE A ZERO
305B 27   65        01830         BEQ   OVER
305D EC   A1        01840         LDD   ,Y++    GET THE TEMPO AND LENGTH
305F 97   D3        01850         STA   $D3     TEMPO
3061 97   D4        01860         STA   $D4     TEMPORARY TEMPO
3063 D7   D2        01870         STB   $D2     LENGTH
3065 A6   9F 3FC0   01880 LOOP2   LDA   [$3FC0] GET ALL THE TCURVE VALUES
3069 AB   9F 3FC3   01890         ADDA  [$3FC3]
306D A9   9F 3FC6   01900         ADCA  [$3FC6]
3071 A9   9F 3FC9   01910         ADCA  [$3FC9]
3075 A9   9F 3FCC   01920         ADCA  [$3FCC]
3079 A9   9F 3FCF   01930         ADCA  [$3FCF]
307D B7   FF20      01940         STA   $FF20   PUT THEM IN PIA
3080 DC   C1        01950         LDD   $C1
```

Register D with the B value in the scale, we get that note's frequency. However, that frequency is only for the lowest octave. As in actual music, each octave increase will double the note's frequency, so it is necessary to first decrease the temporary `OCT1` (1 to 5) by one to get 0 to 4. If it is a zero, it is in the lowest octave and doesn't need to have the note frequency changed. If it is greater than zero, shift Register D (the note frequency) to the left (double it) with:

```
ASLB
ROLA
```

Then decrease the temporary Octave 1 count by one. If the temporary `OCT` is still not zero, keep decreasing it and doubling Register D. When `OCT1` is finally zero, save the note frequency by storing it at Location U.

Since we now have a note, decrease `NOTECT` by one. If `NOTECT` has reached zero, that is the end of the chord. If the `NOTECT` is not zero, check the next character in the chord. If it is a ";", that's the end of the chord (fill up the remainder of the chord with zeros). If it is an O branch to `OCT`, or else branch always back to note.

When a chord is complete, the tempo and length are stored at the beginning of the chord location and the whole process starts back at `CHORD`. If the first character of a chord is zero, it means the music is over. Be sure that the last entry in the `NTABLE` is `FCB 0`.

Each chord is now 14 bytes long — one byte each for the tempo and length and two bytes each for the six notes. You can give your program a title. The program will accept a ";" between chords to make it easier to read them. It is not necessary to make each chord a separate `FCC` line.

First, a word about a new register, the DP register. When using a command like `LDA $C0`, *EDTASM+* first looks to the DP register to get a one-byte number to go before the `$C0`. Since the DP register is initially set to zero, the command is really `LDA $00C0`. However, you can change the DP register. If using a lot of commands involving locations from $3F00 to $3FFF, let the DP register assign the $3F, and you assign the other half. This saves both time and memory.

We can't directly set the DP register, however. Since it is such an important register, the computer doublechecks whether you actually want to change it. So, use this to change it:

```
LDA #$3F
TFR A,DP
```

Now, using `LDA $C0`, the computer actu-

```
3082 E3   A4        01960            ADDD    ,Y       NOTE 1
3084 DD   C1        01970            STD     $C1
3086 DC   C4        01980            LDD     $C4
3088 E3   22        01990            ADDD    2,Y      NOTE 2
308A DD   C4        02000            STD     $C4
308C DC   C7        02010            LDD     $C7
308E E3   24        02020            ADDD    4,Y      NOTE 3
3090 DD   C7        02030            STD     $C7
3092 DC   CA        02040            LDD     $CA
3094 E3   26        02050            ADDD    6,Y      NOTE 4
3096 DD   CA        02060            STD     $CA
3098 DC   CD        02070            LDD     $CD
309A E3   28        02080            ADDD    8,Y      NOTE 5
309C DD   CD        02090            STD     $CD
309E DC   D0        02100            LDD     $D0
30A0 E3   2A        02110            ADDD    10,Y     NOTE 6
30A2 DD   D0        02120            STD     $D0
30A4 0A   D4        02130            DEC     $D4      DECREASE TEMPORARY TEMPO
30A6 26   0E        02140            BNE     DELAY
30A8 0A   D2        02150            DEC     $D2      DECREASE LENGTH
30AA 26   04        02160            BNE     CONT1
30AC 31   2C        02170            LEAY    12,Y     NEXT CHORD LOCATION
30AE 20   A9        02180            BRA     LOOP1
30B0 D6   D3        02190 CONT1      LDB     $D3      TEMPO
30B2 D7   D4        02200            STB     $D4      TEMPORARY TEMPO
30B4 20   AF        02210            BRA     LOOP2
30B6 30   84        02220 DELAY      LEAX    ,X       JUST MAKES A QUICK PAUSE
30B8 30   84        02230            LEAX    ,X
30BA 86   00        02240            LDA     #0
30BC 86   00        02250            LDA     #0
30BE 86   00        02260            LDA     #0
30C0 20   A3        02270            BRA     LOOP2
30C2 4F             02280 OVER       CLRA
30C3 1F   8B        02290            TFR     A,DP     SET THE DP REGISTER BACK TO ZER
O
30C5 35   01        02300            PULS    CC
30C7 BD   A974      02310            JSR     $A974    SOUND OFF
30CA 3F             02320            SWI              RTS IF IN BASIC
30CB      1415      02330 TCURVE     FDB     $1415
30CD      1516      02340            FDB     $1516
30CF      1718      02350            FDB     $1718
30D1      1819      02360            FDB     $1819
30D3      1A1A      02370            FDB     $1A1A
30D5      1B1C      02380            FDB     $1B1C
30D7      1C1D      02390            FDB     $1C1D
30D9      1E1E      02400            FDB     $1E1E
30DB      1E1F      02410            FDB     $1E1F
30DD      2020      02420            FDB     $2020
30DF      2121      02430            FDB     $2121
30E1      2222      02440            FDB     $2222
30E3      2223      02450            FDB     $2223
30E5      2324      02460            FDB     $2324
30E7      2424      02470            FDB     $2424
30E9      2424      02480            FDB     $2424
30EB      2425      02490            FDB     $2425
30ED      2525      02500            FDB     $2525
30EF      2525      02510            FDB     $2525
30F1      2525      02520            FDB     $2525
30F3      2525      02530            FDB     $2525
30F5      2525      02540            FDB     $2525
30F7      2524      02550            FDB     $2524
30F9      2424      02560            FDB     $2424
30FB      2424      02570            FDB     $2424
30FD      2423      02580            FDB     $2423
30FF      2323      02590            FDB     $2323
3101      2322      02600            FDB     $2322
3103      2222      02610            FDB     $2222
3105      2121      02620            FDB     $2121
3107      2121      02630            FDB     $2121
3109      2120      02640            FDB     $2120
310B      2020      02650            FDB     $2020
310D      1F1F      02660            FDB     $1F1F
310F      1F1E      02670            FDB     $1F1E
3111      1E1E      02680            FDB     $1E1E
3113      1E1D      02690            FDB     $1E1D
3115      1D1D      02700            FDB     $1D1D
3117      1D1C      02710            FDB     $1D1C
3119      1C1C      02720            FDB     $1C1C
311B      1C1B      02730            FDB     $1C1B
311D      1B1B      02740            FDB     $1B1B
311F      1B1A      02750            FDB     $1B1A
3121      1A1A      02760            FDB     $1A1A
3123      1A1A      02770            FDB     $1A1A
3125      1A19      02780            FDB     $1A19
3127      1919      02790            FDB     $1919
```

ally executes `LDA $3FC0`. Since speed is critical in a music program, use the DP register frequently, remembering to set it back to zero when finished.

Next, is how to create a timbre curve (`TCURVE`), which is a numerical plot of the frequency each voice traces on a graph — all the highs and lows. It is this curve that gives each musical instrument its distinctive sound.

You can make a different curve for each voice, but this program uses the same curve for all six. Be sure that no single curve byte times the number of voices is greater than 255. In this curve, the highest byte can be 255/6 = 42 or #$2A.

The curve is stored from $3000 to $30FF (256 bytes). The two ROM subroutines set the computer to play notes. Next, set the DP register to #$3F. The location of our `TCURVE`(s) is stored at $(3F)C0, $(3F)C3, $(3F)C6, $(3F)C9, $(3F)CC, and (3F)CF. Now, load Register Y with the chord start location; the first thing the program will check is if the chord starts with zero. If so, this is the end of the music and the program turns off the sound and ends; if not a zero, the program loads the current tempo into $(3F)D3, a temporary tempo into $(3F)D4, and the length into $(3F)D2.

The `TCURVE` value for each voice is added together and stored in $FF20. Note 1 is stored at $(3F)C1, Note 2 at $(3F)C4, Note 3 at $(3F)C7, Note 4 at $(3F)CA, Note 5 at ($3F)CD, and Note 6 at $(3F)D0. Remember, each note is two bytes long. The temporary tempo in $(3F)D4 is decreased by one. If it is not zero, a short delay (pause) is executed just for timing, then the program adds together the second byte of each timbre curve.

This continues until Tempo 1 has reached zero. When it has, the length is decreased and the whole cycle repeats until both the length and the tempo have reached zero. Register Y is loaded with the start of the next chord location, and everything repeats until all of the chords have been played and the program ends.

You may find it easier to enter the music one `FCC` line at a time, and then play it. Be sure to keep a `FCB 0` at the end of the music. You can also watch your text program more closely, this way, to be sure it is not running into the `TCURVE`. If there are a lot of notes, you can relocate the `TCURVE` and chord start locations. If there are six different `TCURVE`s, you will have to change locations. Just be sure that the start of each `TCURVE` is stored at $(DP)C0, $(DP)C3, $(DP)C6, $(DP)C9, $(DP)CC and $(DP)CF.

(Questions or comments about this tutorial may be directed to the author at Route 2, Box 216C, Mason, WI 54856-9302. Please enclose an SASE when requesting a reply.)

```
3129  1919   02800      FDB   $1919
312B  1818   02810      FDB   $1818
312D  1818   02820      FDB   $1818
312F  1818   02830      FDB   $1818
3131  1818   02840      FDB   $1818
3133  1717   02850      FDB   $1717
3135  1717   02860      FDB   $1717
3137  1717   02870      FDB   $1717
3139  1616   02880      FDB   $1616
313B  1616   02890      FDB   $1616
313D  1616   02900      FDB   $1616
313F  1515   02910      FDB   $1515
3141  1515   02920      FDB   $1515
3143  1515   02930      FDB   $1515
3145  1515   02940      FDB   $1515
3147  1514   02950      FDB   $1514
3149  1414   02960      FDB   $1414
314B  1414   02970      FDB   $1414
314D  1313   02980      FDB   $1313
314F  1313   02990      FDB   $1313
3151  1313   03000      FDB   $1313
3153  1313   03010      FDB   $1313
3155  1312   03020      FDB   $1312
3157  1212   03030      FDB   $1212
3159  1212   03040      FDB   $1212
315B  1111   03050      FDB   $1111
315D  1111   03060      FDB   $1111
315F  1111   03070      FDB   $1111
3161  1110   03080      FDB   $1110
3163  1010   03090      FDB   $1010
3165  1010   03100      FDB   $1010
3167  1010   03110      FDB   $1010
3169  1010   03120      FDB   $1010
316B  0F0F   03130      FDB   $0F0F
316D  0F0F   03140      FDB   $0F0F
316F  0F0E   03150      FDB   $0F0E
3171  0E0E   03160      FDB   $0E0E
3173  0E0E   03170      FDB   $0E0E
3175  0E0D   03180      FDB   $0E0D
3177  0D0D   03190      FDB   $0D0D
3179  0D0C   03200      FDB   $0D0C
317B  0C0C   03210      FDB   $0C0C
317D  0C0C   03220      FDB   $0C0C
317F  0B0B   03230      FDB   $0B0B
3181  0B0B   03240      FDB   $0B0B
3183  0A0A   03250      FDB   $0A0A
3185  0A09   03260      FDB   $0A09
3187  0909   03270      FDB   $0909
3189  0908   03280      FDB   $0908
318B  0808   03290      FDB   $0808
318D  0707   03300      FDB   $0707
318F  0707   03310      FDB   $0707
3191  0606   03320      FDB   $0606
3193  0605   03330      FDB   $0605
3195  0505   03340      FDB   $0505
3197  0505   03350      FDB   $0505
3199  0404   03360      FDB   $0404
319B  0404   03370      FDB   $0404
319D  0403   03380      FDB   $0403
319F  0303   03390      FDB   $0303
31A1  0303   03400      FDB   $0303
31A3  0303   03410      FDB   $0303
31A5  0303   03420      FDB   $0303
31A7  0303   03430      FDB   $0303
31A9  0404   03440      FDB   $0404
31AB  0404   03450      FDB   $0404
31AD  0404   03460      FDB   $0404
31AF  0405   03470      FDB   $0405
31B1  0506   03480      FDB   $0506
31B3  0606   03490      FDB   $0606
31B5  0707   03500      FDB   $0707
31B7  0808   03510      FDB   $0808
31B9  0909   03520      FDB   $0909
31BB  0A0A   03530      FDB   $0A0A
31BD  0B0C   03540      FDB   $0B0C
31BF  0C0D   03550      FDB   $0C0D
31C1  0D0E   03560      FDB   $0D0E
31C3  0F10   03570      FDB   $0F10
31C5  1011   03580      FDB   $1011
31C7  1212   03590      FDB   $1212
31C9  1314   03600      FDB   $1314
      2000   03610      END   START
```

ARCADE STYLE JOYSTICK JUST FOR THE COCO

NOW GET THE RESPONSE YOU WANT WHILE PLAYING YOUR FAVORITE COCO GAME. MOVE THE CONTOURED GRIP JUST A FRACTION OF AN INCH IN ANY DIRECTION AND INSTANTLY YOUR COCO IS PERFORMING YOUR COMMAND.

FEATURES:

- auto fire lockdown releases continuous stream of bullets
- dual fire buttons use either thumb or trigger finger
- suction cup base for one hand play
- 6 micro-switches for super sensitivity

To get your own Questron joystick, send $29.95 to

QUESTRON
P.O. Box 1013
Rochester, IN 46975-1013
or call
219-223-5584
C.O.D.s add $3.00

COMPUTER ISLAND EDUCATIONAL SOFTWARE

French Baseball........$19.95
Spanish Baseball....... 19.95
Cocowheel of Fortune (for Coco3/RGB Monitor). 19.95
Number Sequences....... 19.95
Signed Numbers......... 19.95
Area and Perimeter..... 19.95
Context Clues Grade 2... 19.95
Cocojot................ 16.95

COMPUTER ISLAND
227 Hampton Green
Staten Island,NY 10312
(718) 948-2748

Add $1.00 postage, NY res. add tax
VISA, MC - Send for free catalog

16K ECB

Math target practice

Shooting Math

By Steve Blyn
Rainbow Contributing Editor

Our youngest child was born eight years ago when our first CoCo was purchased. Time has flown by quickly and Shari is now completing second grade. She has recently taken possession of our original computer, which has been upgraded, of course, but retains its charming outward appearance — the chicklet keyboard and steel gray color (worn out here and there). It is as reliable as ever.

Shari is now full of math facts from school, her nightly homework including reviews of new things learned each day. Last week, she even surprised us with some pre-algebra examples. This learning method of practice and mastery is customary for her grade level, and we often use a variety of computer programs with the CoCo to aid her in maintaining those skills.

This month's article presents a new method of reviewing some basic math skills, concentrating on mental addition and subtraction. Also reinforced is the skill of thinking first before determining which operation is needed to compute each example.

The particular program provides a random starting-off number at the bottom right corner of the screen, a random target number to be reached at the bottom left corner. At the top of the screen are eight random numbers that include plus and minus signs. The object of the game is to shoot the numbers at the top of the screen, altering a given number to the target number. Below is an example:

```
+8  -3  -7  +5  +1  +6  -4  +2



                *
14     TIMER 42         7
```

The bottom left number (14) is the target number to be reached while the bottom right number is the starting number. The child must first determine that using addition is probably the best — but not the only — way to begin solving this problem. As is often the case with math problems, there are several ways to reach a solution.

The target may be reached by shooting +2 and +5 at the top, or by shooting -3, +6 and +2 twice. Part of the fun for students is to find how many ways an answer can be found. If the student understands negative and positive numbers, the amount of possible solutions becomes much greater.

The asterisk in the illustration represents the shooter, and arrow keys permit the student to move the shooter left and right. When the shooter is directly below the desired number, the space bar is pressed to shoot the number that is then added or subtracted accordingly to the running total at the bottom right of the screen. A round is won when the proper amount obtained in the running total corresponds to the target amount shown in the bottom left of the screen. Music plays and the student may press either ENTER to get another example or E to end the program.

A timer that allows roughly 100 seconds was incorporated to help focus attention on the task at hand. Without the timer it may be too tempting for the child to shoot randomly at numbers for the fun of it, eventually solving the example. You may alter the timer's length or remove it by revising or deleting Line 180.

Creatively alter any part of the program to help your child/students with math practice. We at Computer Island always enjoy hearing of new ideas for our programs.

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees, and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

The Listing: MATHSHOT

```
10 REM"MATHSHOOT"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1989"
30 CLS0:TIMER=0:A=5+RND(15):G=5+
RND(15):IF A=G THEN 30:REM A=TAR
GET AND G=RUNNING TOTAL
40 FOR T=1024 TO 1052 STEP 4
50 RR=RND(2):IF RR=1 THEN R=43 E
LSE R=45
60 NN=48+RND(9)
70 POKE T,R:POKE T+1,NN:NEXT T
80 FOR T=1056 TO 1087:POKE T,156
:NEXT T:FOR T=1440 TO 1471:POKE
T,156:NEXT T
90 X=32:Y=24:C=8
100 RESET(X-1,Y):RESET(X+1,Y):SE
T (X,Y,C)
110 A$=INKEY$
120 IF A$=CHR$(9) THEN X=X+1
130 IF A$=CHR$(8) THEN X=X-1
140 IF X<2 THEN X=1
150 IF X>61 THEN X=62
160 IF A$=CHR$(32) THEN GOSUB 21
0
170 M=INT(TIMER/60):PRINT@448,A;
:PRINT@474,G;:PRINT@460,"TIMER";
M;
180 IF M>99 THEN PRINT@458," TIM
E IS UP ";:GOTO 410
190 IF A$="" THEN 110
200 GOTO 100
210 PLAY"O4L150A"
220 FOR Y=22 TO 6 STEP -2:PLAY"C
DC":SET(X,Y,8):NEXT Y
230 FOR Y=24 TO 6 STEP -1
240 RESET(X,Y):RESET(X+1,Y):NEXT
 Y
250 SET(X,24,8)
260 Y=24
270 H=PEEK(INT(X/2)+1024)
280 IF H<48 THEN 380
290 IF H>58 THEN 380
300 H$=CHR$(H):J=VAL(H$)
310 I=PEEK(INT(X/2)+1023)
320 K=PEEK(INT(X/2)+1022)
330 IF I=45 THEN G=G-J
340 IF K=45 THEN G=G-J
350 IF I=43 THEN G=G+J
360 IF K=43 THEN G=G+J
370 PLAY"L50GFEDC"
380 PRINT@448,A;:PRINT@474,G;
390 IF G=A THEN PRINT@458,"YOU W
IN !!!";:GOTO 410
400 RETURN
410 FOR T=1 TO 5:PLAY"CDEFGFEDC"
:NEXT T
420 E$=INKEY$
430 IF E$=CHR$(13) THEN RUN ELSE
 IF E$="E" THEN 440 ELSE 420
440 CLS:END
```

XTEAM & OS-9

XTERM

OS-9 Communications program

- Menu oriented
- Definable macro keys
- Upload/download Ascii or XMODEM protocol
- Works with standard serial port, RS232 Pak, or PBJ 2SP Pack, Includes all drivers
- Execute OS-9 commands from within XTERM
- Works with standard screen, Xscreen WORDPAK or DISTO 80 column board

$49.95 with source **$89.95**

ECONOMIST

Perform economic analysis to compare different cost and income alternatives! Compute present and future Life Cycle Worths for various combinations of single, series and gradient dollar amounts. Quickly edit and recompute for sensitivity analysis! Display line graphs. Printout data and results. Pull-down menus, windows and prompts. Requires os-9 level II and Basic09.

$39.95 WITH SOURCE $79.95

HARDWARE

512k memory upgrade	$134.95
Ram Software Ram Disk Print Spooler Quick Backup	All three for only $19.95

*Software by ColorVenture

XWORD

OS-9 word processing system

- Works with standard text screen, XSCREEN, WORDPAK, or DISTO
- True character oriented full screen editing
- Full block commands
- Find and Replace commands
- Proportional spacing supported
- Full printer control, character size, emphasized, italics, overstrike, underline, super/sub-scripts
- 10 header/footers
- Margins and headers can be set different for even and odd pages

$69.95 with source **$124.95**

XMERGE Mail merge capabilities for XWORD

$24.95 with source **$49.95**

XSPELL OS-9 spelling checker, with 40000 word dictionaries

$39.95

XTRIO XWORD/XMERGE/XSPELL

$114.95 with source **$199.95**

XED OS-9 full screen editor

$39.95 with source **$79.95**

XDIS OS-9 disassembler

$34.95 with source **$54.95**

XDIR & XCAL Hierarchial directory, OS-9 calculator

$24.95 with source **$49.95**

THE DIRECTOR

Produces hires picture sound and color animation shows. Completely menu driven with full editing. Great for presentations and vcr's. Requires COCO III only.

$39.95

Call for package price

AND FOR RS DOS ...

SMALL BUSINESS ACCOUTING

This sales-based accounting package is designed for the non-accountant oriented businessman. It also contains the flexibility for the accounting oriented user to set up a double entry journal with an almost unlimited chart of accounts. Includes Sales Entry, transaction driven Accounts Receivable and Accounts Payable, Journal Entry, Payroll Disbursement, and Record Maintenance programs. System outputs include Balance Sheet, Income Statement, Customer and Vender status Reports, Accounts Receivable and Payable Aging Reports, Check Register, Sales Reports, Account Status Lists, and a Journal Posting List.

$79.95

INVENTORY CONTROL/SALES ANALYSIS

This module is designed to handle inventory control, with user defined product codes, and produce a detailed analysis of the business' sales and the sales force. One may enter/update inventory data, enter sales, run five sales analysis reports, run five inventory reports, set up product codes, enter/update salesman records, and update the SBAP inventory.

$59.95

PAYROLL

Designed for maintaining personnel and payroll data for up to 200 hourly and salaried employees with 8 deductions each. Calculates payroll and tax amounts, prints checks and maintains year-to-date totals which can be automatically transferred to the SBA package. Computes each pay period's totals for straight time, overtime and bonus pay and determines taxes to be withheld. Aditional outputs include mailing list, listing of employees, year-to-date federal and/or state tax listing, and a listing of current misc. deductions. Suited for use in all states except Oklahoma and Delaware

$59.95

PERSONAL BOOKKEEPING 2000

Handles 45 accounts. Enters cash expenses as easily as checks. Handles 26 expense categoriesK. Menu driven and user friendly.

$39.95

ACCOUNTS RECEIVABLE

Includes detailed audit trails and history reports for each customer, perpares invoices and monthly statements, mailing labels, aging lists, and an alphabetized customer listing. The user can define net terms for commercial accounts or finance charges for revolving accounts. This package functions as a standalone A/R system or integrates with the Small Business Accting package.

$59.95

ACCOUNTS PAYABLE

Designed for the maintenance of vendor and A/P invoice files. The system prints checks, voids checks, cancels checks, deletes cancelled checks, and deletes paid A/P invoices. The user can run a Vendor List, Vendor Status report, Vendor Aged report, and an A/P Check Register. This package can be used either as a standalone A/P system or can be integrated with the Small Business Accounting Package.

$59.95

MICROTECH
CONSULTANTS
INC.
1906 Jerrold Avenue
St. Paul, MN 55112

Dealer Inquiries Invited
Author Submissions accepted
OS-9 is a trademark of Microware

Ordering Information

VISA MasterCard

Add $3.00 shipping & handling, MN residents add 6% sales tax.
Visa, Mastercard, COD (add $3.50), personal checks.

(612) 633-6161

COCO Q&A CONSULTATIONS

By Marty Goodman
Rainbow Contributing Editor

Double- or Single-Sided?

I purchased two Radio Shack drives around 1982 (Cat. nos. 26-3029 and 26-1161A). Both are full-height with case and power supply. How can I tell if they are double- or single-sided?

Donald M. Challans
Carlinville, Illinois

All drives Radio Shack sold for the Color Computer prior to the current FD 502 half-height drive were single-sided. Most were 40-track capable, and capable of stepping as fast as 6ms per track. But the very first drive marketed for the Color Computer (Cat. No. 26-3022) had only 35 tracks and could not step faster than 20 ms per track.

The Cat. No. 26-1161A drive you refer to appears in my 1982 Radio Shack catalog as a Model III external drive unit. It is single-sided, probably 40-track, and compatible with the Color Computer.

As for telling if a drive is single- or double-sided, you need to inspect the drive. Sometimes this can be done without removing the case. Peer into the opening where the disk is inserted and look for: Single-sided drives with one head on one side of the disk, and on the other side a pressure pad, often made of white felt. Double-sided drives with two heads facing each other, one reason why you should never close the gate on a double-sided drive with no disk inside.

Note that the older Radio Shack full-height drives tend to be selected as Drive 0, 1, 2 and 3 via a special cable that has teeth missing from its connectors. Most other brand drives, including more recent Tandy drives, accomplish disk drive number selection via jumpers on the disk drive.

Serial Connections

Is it possible to connect more than one serial device into the I/O port on the back of my CoCo 3? Is there a database program capable of storing both digitized pictures and text and then retrieving them?

Clay Daetwyler
Washington, Pennsylvania

You cannot hook up more than one serial device to the CoCo port at one time. However, various companies, such as Microcom, sell switchers that allow convenient switching between one of two or three serial devices (such as between a printer and a modem).

I know of no database program like the one you are describing. Too much memory and disk storage is required by such an application for it to be economical to develop and market such a program for the CoCo. I recommend a Macintosh since those applications are well developed on it. But be prepared to spend a minimum of a couple thousand dollars to get it up and running.

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

CoCo Crashing

My 512K CoCo 3 has been intermittently crashing, putting garbage on the screen and turning on the disk drives. Could my Multi-Pak be at fault?

Christiane Tom
Verdun, Quebec

It is easy to determine if your Multi-Pak is at fault: Simply remove the Multi-Pak from the system, plug the disk controller directly into the CoCo 3 and see if the same problem occurs.

The older Multi-Paks (Cat. No. 26-3024) need to be upgraded by adding a new PAL chip, which can be ordered from any of a number of RAINBOW advertisers. It has been suggested that you must use one upgrade newer (26-3124) Multi-Paks with a special satellite board, such as the one described in my October '88 article ["Quick Fixes," Page 58], but I have yet to hear a confirmed report that this is required if you are careful not to use old, obscure add-on cards that are addressed to ports above $FF7F.

Surprise for ROM Pack Owners

How can I put the ROM packs Rad Warrior *and* Super Pitfall *onto disk? I do not own a Multi-Pak and am very reluctant to plug and unplug my disk controller.*

Steve Griffith
Signal Mountain, Indiana

Part of the information needed to do this is posted in the Games database on Delphi. All you need to figure out is how to dump all 32K of the ROM pak to tape, then disk. Eventually someone will post how-to instructions for doing that.

Owners of Multi-Paks will be interested to know that by the time of the Chicago '89 RAINBOWfest, a device should be available from Zebra Systems that allows owners of Multi-Paks to run off disk any ROM pak game ever made, provided this is in your Multi-Pak. The Wild Card ROM pak emulator will also be of interest to those developing ROM software for the CoCo 3.

CoCo Running Hot

My 512K CoCo 3 tends to run hot. Is it best to unplug it when I am not using it?

R. Daniels
Aurora, Colorado

Yes, it is best not to run the machine all day if you are using it for only a couple of hours. At the same time, it is better to not switch it on and off several times within a short period because the shock of powering up and down causes more wear and tear on the machine than a half-hour of solid operation.

One of the problems of the CoCo 3 is its somewhat marginal power supply. In past columns I've discussed various remedies for this problem — fans, replacing the existing power transistor and a heat sink with high current handling the parts (like a TO 3 case 2N3055 transistor and a thick, finned aluminum heat sink), or simply leaving the cover off the CoCo to allow for better convective cooling. These suggestions may help.

Multi-Pak and *CoCo Max III* Clash

When my upgraded 26-3024 Multi-Pak is used with my CoCo 3, CoCo Max III *(an older version) crashes. Colorware says I have to pay for a new version to fix the problem. Is there any way to fix the Multi-Pak instead?*

Dylan Kucera
Newmarket, Ontario

I am unaware of any specific problems caused by a properly upgraded 26-3024 Multi-Pak. In theory, the presence of the Multi-Pak is expected to produce, in some situations, minor timing problems with certain types of code. I know of no fix for such problems. You could try replacing all the chips in the Multi-Pak with a LS- or F-series chips (that offer shorter gate delays) and replacing the PAL chip with a network of a LS- or F-series TTL logic chips. It hardly seems worth the effort, however.

As a possible compromise, try desoldering and socketing just the LS367 and LS245 chips in the Multi-Pak, replacing them with S-series 367 chips and F-series 245 chips. This has some effect in decreasing the added gate delays caused by the Multi-Pak, though I don't know if it will solve your problem.

For the Sufficient Hacker

Can I adapt a Hercules type IBM monochrome graphics card to the CoCo 3? This would give 640-by-350 general purpose graphics resolution in monochrome. How about other, higher-resolution cards or hooking the old Tandy X-Pad to the CoCo 3 at 2 MHz? Also, how can I make a 2 megabyte upgrade for the CoCo 3?

Lorenz Christophe
Charleroi, Belgium

While a sufficiently single-minded hacker can do any of the things you suggest, I am quite confident that you will never see any of those things widely available for the CoCo 3 end-user. The reasons are the cost of such maneuvers and the lack of available software to take advantage of such things. And so, instead, there is a good market for such hardware modifications and the extremely high price of memory chips. Consider this: 640-by-350 is not much greater than 640-by-200. Not enough to spend the $150 or so that such a modification would cost (plus the cost of a Multi-Pak). And there are few, if any applications, commonly in use by large numbers of CoCo owners requiring more than 512K of memory. The $320 worth of memory chips plus the cost of the add-on board for a 2-Meg upgrade is far better spent on a hard drive system.

Adding Drives

What sort of drive can I add to my FD 501 drive system? Can I add a 40- or 80-track double-sided drive? Or does the drive I add have to be a single-sided 35-track drive like the FD 501?

Ron Mills
Bonnyville, Alabama

First of all, the drive in the FD 501 system is a TEC brand model 501 40-track single-sided drive. Thirty-five-track drives or single-sided; 40-track drives have not been made for many years. Next, yes you can hook a variety of 40- and 80-track drives together, but you have to know what you are doing. And, actually,it makes little sense to have one double-sided and one single-sided drive in the same system, since then you will not have a convenient way of making backups of the double-sided drive. There is no way to read the "other side" of a double-sided drive on a single-sided drive. It is physically impossible. You can, as a temporary measure, get a double-sided drive and install it, but you will soon want to get a second one of the same number of tracks, and toss out the FD 501 single-sided drive.

Note that while under OS-9, it is relatively easy to support different drive types. Under RS DOS this is rather tricky. I have consistently recommended *ADOS* (from SpectroSystems) for help with setting up systems using different kinds of drives. But you still need to know about drive selection, terminator resistors, cabling, and the like.

Extended ADOS 3

I have four questions: How can I best use my 80-track drives under Radio Shack Disk BASIC*? Can I use the 6K of space so profligately wasted by the picture of the three Mugateers in my CoCo 3 ROM for useful software, like* SIGMON, *and how could I do this? How can I put four 8K DOSs inside a 27256 EPROM and use that in my disk controller, which is geared to using a 2764 EPROM? Finally, how can I force my CoCo 3 to power up with a different palette color set?*

Thierry Lorenz
Fontaine, Belgium

In response to questions one and four, if you do not have a hard drive, then *Extended ADOS 3* (which is soon to be released, and requires a 27128 EPROM) is your best bet for supporting 80-track drives under RS DOS. If you do use a hard drive, then you might want to consider *Hyper-I/O* from Burke and Burke, which is geared to hard drive systems but can support other storage media as well. *ADOS* (*ADOS 3* or *Extended ADOS 3*) will also allow you to configure your CoCo so that when you burn it into a DOS EPROM, the computer comes up with whatever palette and column width (32, 40 or 80) you want.

Concerning your second question, using the spare 6K in the ROM is possible but is one of those things that "if you have to ask how, don't try it." It involves significant hardware competence in desoldering and socketing a ROM chip, intimate knowledge of Disk BASIC and the GIME ROM select control. But I do know one software developer who has done almost exactly what you've suggested. "How-to" instructions for it would fill a good-sized article, though.

Now, to address Question three. Using a single 27256 chip as four banks of 8K DOSs is easy: Just burn the four DOSs into the chip, then raise pins 26 and 27 (the A13 and A14 lines on the chip) up in the air when you insert the chip into the 28-pin socket intended for a 2764. Tie each of those two lines high (to +5 volts, Pin 28) via a 4.7K ohm resistor. Then hook to each of those pins an SPST switch to ground. By putting those two SPST switches (which can be mini toggle or DIP switches) into any of their four possible combinations of settings (00, 01, 10, and 11) you can select each of the four banks in the EPROM. What you are doing here is providing for manual switching of the status (high or low) of the two high-order address lines on the chip.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form which has complete instructions.

Developing a PRINT @ screen utility program

Boxcars, Boxcars, Boxcars

By Joseph Kolar
Rainbow Contributing Editor

We made a few utility programs, but somehow missed the `PRINT @` screen, so this month we'll make a 32-by-16 `PRINT @` screen.

Look at Listing 1, then key lines 1, 10 and 60. Line 20 creates the first boxcar, which contains the directions to create two rows. In size `S4`, `A$="R255D12L255D12"`. The super-boxcar contains four `A$` boxcars consisting of eight rows. Line 40 prints them on the screen, has an engine, `DRAW"S4C4BMO,0"`, coupled to two super-boxcars, `B$`, and a caboose, `+"R255"`. `S4C4` can be omitted from the engine because of the default syndrome. Likewise, you can have an extra super-boxcar, `+B$`.

I decided to use `S16`, since the raw material in boxcar `A$` is easily converted from `S4` to `S16`. Because `S1` is four times larger than `S4`, we need one-fourth of the size needed in `S4`.

Divide the numbers in `R255D12L255D12` by four and you get `R64D3L64D3`. This requires the engine in Line 40 to contain `S16` and even the not needed `C4`. There is no change in the number of boxcars, though the caboose should be `+"64" +"R255"`, or `+B$` will draw the 17th row. You have three ways to construct the bottom row:

Key in Lines 20 and 40, then run the program. Seventeen rows are created instead of 16, but you do not need an extra border program line.

At Line 30 the boxcar `C$` is created in `S4`, which must be put in the boxcar to tell CoCo you are changing size. (It can be placed inside the engine at Line 50.)

`C$` creates two vertical lines. A super-boxcar, `D$`, contains four regular boxcars consisting of eight columns. In Line 50 the engine begins as the left border and tacks on four super-boxcars, `D$`. After two super-boxcars are concatenated, you are in danger of overloading the train. A small engine, `DRAW`, is required to assist in pulling the rest of the train, while a caboose is required to add the third column. Can you use an extra `+D$` instead of `+"D191"`?

Actually, Line 50 can be assembled (engine; four super-boxcars; small engine; caboose;) to read:

```
50 DRAW"BMO,0"+D$+D$+D$+D$:DRAW"D191"
```

`DRAW` is required to set the third column.

Using an extra super-boxcar `B$` in Line 40 and `D$` in Line 50, instead of `+"R255"` and `"D191"`, respectively, saves seven bytes. Again, save a copy of your work.

The graphic screen, 64-by-32, is actually the `PRINT @` screen divided into four quadrants. We will create the graphic character set, `CHR$(128)` through `CHR$(143)` for use on the Hi-Res screen, as well as `GET-PUT` to draw.

If you didn't sayonara the new utility, don't. If you did, load it back in by typing `DEL60` and `1000 GOTO 1000`.

Look over Listing 2. Key in Line 2, the `DIM` line; `A(2)` through `H(2)` and `A1(2)` through `H1(2)`. `A` through `H` are the eight configurations of the 8-by-12 graphic `CHR$` boxes; `A1` through `H1` are the mates. For instance,`CHR$(133)` is the mate of `CHR$(138)`; `CHR$(129)` is the mate of `CHR$(142)`.

While developing the graphic set you don't want the `PRINT @`screen, so type in `15 GOTO 200` to bypass the utility for now. Each box is 8-by-12, calculated by dividing the number of full screen spaces, 256x192, by the `PRINT @` screen, 32x16. (256/32=8; 192/16=12; 8x12).

At Line 200, you can begin drawing the designs in pairs so that Line 200 houses one and Line 210 houses the mate.

The first, `CHR$(128)`, is located at (0,0); painting is done in `C4`. The painless way to figure the `PAINT` coordinates is as follows:

For color in the upper-left quadrant, augment the starting coordinates by +2,+2; for the lower-left quadrant, augment the starting coordinates by +2,+8; the upper-right quadrant, augment +6,+2; and the lower-right quadrant by +6,+8.

The pairs and assigned variables are:

```
CHR(128) A CHR$(143) A1
   (137) B    (134) B1
   (131) C    (140) C1
   (133) D    (138) D1
   (139) E    (132) E1
   (142) F    (129) F1
   (141) G    (130) G1
   (135) H    (136) H1
```

From the listing, key in lines 200 through 350, copying the designs on graph paper. Create them from the data in each program line and use the paint coordinates to shade them in.

When finished, check them out by first putting them in `GET` statements and assigning them the proper identifying variable.

Take the beginning coordinates extracted from the appropriate `DRAW` line, and add `+200` to the `DRAW` line number used for the associated `GET`. Thus, `DRAW` line `200 +200= GET` line `400`. `DRAW` line `250+200` produces `GET` line `450`.

Since each graphic character occupies an 8-by-12 area, to the beginning coordinates, (0,0), add +8,+12. (0+8=8; 0+12=12). The ending coordinates = (8,12). After a few lines, you'll get the hang of it. In fact, the vertical coordinates are always (H,0)-(H,12). Likewise, the horizontal component, H, always ends as 0 in the starting coordinate and eight in the ending coordinate.

The quickest and surest way to proceed is to `LIST200`; add 200 to the `DRAW` line to get the `GET` line number (Use the coordinates in the listed line as the beginning coordinates in the `GET` line); calculate and add the ending coordinates; add the assigned variable and tack on `G`. Without referring to the `GET` part of the listing, work them out and key them in.

When you've keyed in all the `GET` statements, run the program to check for any Syntax errors. Check the graphics characters for the proper variables assigned as well as any errors in the listing.

In order to use `PRINT @`, or graphic utility, make the following additions:

```
3 GOTO 199
99 GOTO 99
DEL100
199 PMODE3,1:PCLS
600 PCLS:SCREEN1,0
999 GOTO 20
```

Now you must start at a horizontal coordinate that is divisible by eight, (0,8,16,...240) and a vertical coordinate

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer that is divisible by 12, (0, 12, 24, 36,...180).

Key in the following test line: `610 PUT(240,180)-(248,191),A,PSET`, then run the program . Substitute all the variables, one at a time, and check them out. To get rid of the utility, put a `REM` in front of Line 999, masking it.

There is a flaw in this utility; you can't use the last column to set graphic blocks. (There is a way to force it, but we won't do so.) Instead, you get the proverbial bunched-up junk. It's a trade-off — loss of the last column for easily calculated even-numbers. You can't use ending coordinates (256,192); 256 is out of CoCo's range. You can use 192-255 on the vertical because they all are equivalent, in this case, to 191 and within CoCo's range.

Substitute other values for those in Line 610. This gives you the feel of working with coordinates adaptable to the grid intersecting points.

One advantage over the staid Lo-Res graphics is that you can remove the utility and align the designs to any pair of starting coordinates such as (4,4), (7,12), (3,25). However, the +8,+12 must be added consistently for the ending coordinates to get a viable graphic character.

The grid needs locating guides, so I divided the screen into four quadrants. Type in:

```
60 DRAW":C2BM128,0D96N1128NR128D96C4"
```

Note the cross-hair Line 60 ending in `C4`. I didn't want to take a chance. CoCo is reminded to return to `C4` after the cross-hairs are created in `C2`.

The utility may make the character set appear distorted due to the way the set is drawn or to a shadow inherent on your TV. Blank areas are partly overprinted on the grid lines, so it is important to wipe out the utility by masking Line 999.

The acid test is to create a design on the utility and then wipe it out to see what is left.

Delete Line 610 and any other lines introduced while conducting the test, making sure the utility is operational, then unmask Line 999 and run the program. The utility should now be divided into four quadrants.

Here's an idea! Place `CHR$(140)`, `C1`, in the box two lines above the white horizontal guideline, directly left of the vertical white line. The starting coordinates are (120,72). A `PUT` Line 700 is created. (See Listing 2.) Another `PUT` Line 10 creates a similar box next to it. Now run the program, each line in succession.

Can you anticipate my next move? If you can't, you may be considering an alternate move as a springboard to greater things.

After you finish Line 770, take a break. Did you notice that when making a design that returns to the point of origin, such as a circle or oval, rather than proceeding in a clockwise or counter-clockwise direction, the graphic blocks are set according to the horizontal orientation? This is to simplify hunting for coordinates. Since any blocks in the same horizontal row have the same beginning and ending vertical component coordinates, it's easy to get confused with the jumble of coordinates constantly manipulated.

A few curliques were added beginning with Line 800, and I abandoned the constraints of the formal block locations beginning with Line 840. The graphics characters are manipulated into position across the box delineator lines, using odd numbered vertical coordinates. It is sometimes a bit difficult so take it slow.

Lines 880 and 890 center the characters, while Line 900 creates a bit of color in the middle, from the 4-by-6 box square of `CHR$(135)`, `H`. Any one of `E`,`F`,`G` or `H` will fit in, but it's easier to work with `H` because the 4-by-6 box is oriented in the upper left-hand quadrant. It's exercise to move it -- 2, -3 to center in the exact middle.

CINSOFT
PROGRAMS • PERIPHERALS • SUPPLIES • SERVICE

Fast Delivery...
Friendly Service

Now in our 7th year!

Avatex Modems

* NEW LOW PRICES *

Avatex 1200e $79
with Coco Cable 89
Avatex 2400 $169
with Coco Cable 179
(Coco 3 only)
with RS-232 Cable* 185

Reviewed in April, 1988 Rainbow!

Avatex 1200e, Cable AUTOTERM... $119
RAINBOW CERTIFICATION SEAL
Avatex 2400, Cable AUTOTERM ... $209

*Coco 1, 2 requires Deluxe RS-232 Pak

• Call •
513-396-SOFT
• Shop by Modem •
513-396-SHOP

VISA MasterCard AMERICAN EXPRESS

2235 Losantiville, Cincinnati, OH 45237
SHIPPING will be charged at our ACTUAL COST
Ohio residents add 5.5% Sales Tax COD add 3.00

Alpha Software Technologies
Your OS9 Solution

New
Presto-Partner (Multi-Vue compatible!)
This is what you have been waiting for! Finally RAM-Resident software for your COCO 3! Runs in the background while you do other work! Includes a note-pad that does automatic number calculations, a calendar with alarm feature, a phone book that can auto-dial your phone, a real-time clock and much, much, more! This program will organize your entire life!
512k OS9 Level II Required..........Only $29.95!

OS9 Level II BBS Release 3.0
System comes complete and ready to run. Use the built in menus or create your own. Run your own programs or games on-line! Complete message system included. File transfer system supports Xmodem and Ymodem as well as keyword searching! Even comes with it's own Terminal program! Now includes ANSI graphics menus and editor! See the board while it runs! For a DEMO call (504)734-0192 (300/1200 baud) or (508)675-0912 (3/12/2400 baud).
512k OS9 Level II and RS-232 Pak Required..........$29.95

Level II Tools
Without the right tools, OS9 is difficult...These ARE the right tools! With these great utilities you'll be using OS9 like a pro! Complete wildcard, Tree and Windowing utilities make OS9 easy to use. If you want to use OS9, This is what you need! 25 great utilities for only $24.95! Stop fighting with OS9!
128k OS9 Level II Required..........$24.95

Disk Manager Tree (Multi-Vue compatible!)
No more fighting with directories. Change, create, and delete directories, copy, view and delete files. A MUST for the OS9 beginner! Great for ANY OS9 user!
512k OS9 Level II Required..........$29.95

Warp One (Multi-Vue compatible!)
Finally a complete OS9 Level II windowing terminal! Many features include Auto Dial & Macro, X & Ymodem, ANSI graphics, buffer capture, on-line timer, chat-mode, windows and much, much more! Perfect for any BBS user!
512k OS9 Level II and RS-232 Pak Required..........$34.95

The Zapper (Multi-Vue compatible!)
This wonderful utility allows you to patch anything! Patch commands on disk and fix CRCs automatically! Patch the OS9boot file! Save lost files! Fix crashed disks!
64k OS9 Level I or II required..........$19.95

Multi-Menu (Multi-Vue compatible!)
Easily create your own pop-down menus with this great utility! No programming Needed! Run any OS9 command from a menu. A must for any Multi-Vue user!
512k OS9 Level II and Multi-Vue required..........$19.95

Send check or money order to: Alpha Software Technologies
P.O. Box 16522
Hattiesburg MS. 39402
Or call: (601) 266-2773 (voice)
(508) 675-0912 (modem)
RAINBOW CERTIFICATION SEAL
Please add $3.00 Shipping and handling C.O.D. Orders add an additional $2.00

Mask Line 999 to get rid of the utility.

The four curliques, `B` and `B1`, can be separated a bit more. The test is relocating the four units to give better symmetry to the design, pull in the two vertical members, or improve the design.

Incidently, you can use the `DRAW` and `PAINT` statements to fill in the central area. However, there's no sense in `GET`ting without `PUT`ting. The raw material has already been created. Use it!

Before working on the program, save a copy. Try these changes:

```
10 PMODE4,1: PCLS:SCREEN1,1
600 PCLS:SCREEN1,1
```

Then run the program.

Now, change lines 10 and 600 to the other screen. `SCREEN1,0`. Change line 199 to `199 PMODE4,1:PCLS` and run the program.

Change lines 10 and 600 back to `SCREEN1,1` and run the program. ❑

Listing 1: `BOXCAR1`

```
0 'PRINT@
1 CLEAR500
10 PMODE3,1:PCLS:SCREEN1,0
20 A$="R64D3L64D3":B$=A$+A$+A$+A
$
30 C$="S4D191R8U191R8":D$=C$+C$+
C$+C$
40 DRAW"S16C4BM0,0"+B$+B$+B$
50 DRAW"BM0,0"+D$+D$+D$+D$:DRAWD
$
60 GOTO60
```

Listing 2: `BOXCAR2`

```
0 'LISTING2
1 CLEAR500
2 DIM A(2),B(2),C(2),D(2),E(2),F
(2),G(2),H(2),A1(2),B1(2),C1(2),
D1(2),E1(2),F1(2),G1(2),H1(2)
3 GOTO199
10 PMODE3,1:PCLS:SCREEN1,0
20 A$="R64D3L64D3":B$=A$+A$+A$+A
$
30 C$="S4D191R8U191R8":D$=C$+C$+
C$+C$
40 DRAW"S16C4BM0,0"+B$+B$+B$
50 DRAW"BM0,0"+D$+D$+D$+D$:DRAWD
$
60 DRAW"C2BM128,0D96NL128NR128D9
6C4"
99 GOTO99
199 PMODE3,1:PCLS
200 DRAW"BM0,0R8D12L8U12":PAINT(
2,2),4,4
210 DRAW"BM10,0BR8BD12BL8BU12":P
AINT(12,2),1,4
220 DRAW"BM20,0BR4R4D6L8D6R4U12"
:PAINT(26,2),4,4:PAINT(22,8),4,4
230 DRAW"BM30,0R4D12R4U6L8U6":PA
INT(32,2),4,4:PAINT(36,8),4,4
240 DRAW"BM40,0R8D6L8U6":PAINT(4
2,2),4,4
250 DRAW"BM50,0BD6R8D6L8U6":PAIN
T(52,8),4,4
260 DRAW"BM60,0R4D12L4U12":PAINT
(62,2),4,4
270 DRAW"BM70,0BR4R4D12L4U12":PA
INT(76,2),4,4
280 DRAW"BM80,0BR4R4D6L4U6":PAIN
T(86,2),4,4
290 DRAW"BM90,0R4D6R4D6L8U12":PA
INT(92,2),4,4
300 DRAW"BM100,0BD12BR4R4U6L4D6"
:PAINT(106,8),4,4
310 DRAW"BM110,0R8D6L4D6L4U12":P
AINT(112,2),4,4
320 DRAW"BM120,0BD6R4D6L4U6":PAI
NT(122,8),4,4
330 DRAW"BM130,0R8D12L3U6L4U6":P
AINT(132,2),4,4
340 DRAW"BM140,0R4D6L4U6":PAINT(
142,2),4,4
350 DRAW"BM150,0BR4R4D12L8U6R4U6
":PAINT(156,2),4,4
400 GET(0,0)-(8,12),A,G
410 GET(10,0)-(18,12),A1,G
420 GET(20,0)-(28,12),B,G
430 GET(30,0)-(38,12),B1,G
440 GET(40,0)-(48,12),C,G
450 GET(50,0)-(58,12),C1,G
460 GET(60,0)-(68,12),D,G
470 GET(70,0)-(78,12),D1,G
480 GET(80,0)-(88,12),E,G
490 GET(90,0)-(98,12),E1,G
500 GET(100,0)-(108,12),F,G
510 GET(110,0)-(118,12),F1,G
520 GET(120,0)-(128,12),G,G
530 GET(130,0)-(138,12),G1,G
540 GET(140,0)-(148,12),H,G
550 GET(150,0)-(158,12),H1,G
600 PCLS:SCREEN1,0
700 PUT(120,72)-(128,84),C1,PSET
710 PUT(128,72)-(136,84),C1,PSET
720 PUT(112,84)-(120,96),D1,PSET
730 PUT(136,84)-(144,96),D,PSET
740 PUT(112,96)-(120,108),D1,PSE
T
750 PUT(136,96)-(144,108),D,PSET
760 PUT(120,108)-(128,120),C,PSE
T
770 PUT(128,108)-(136,120),C,PSE
T
800 PUT(112,60)-(120,72),B1,PSET
810 PUT(136,60)-(144,72),B,PSET
820 PUT(112,120)-(120,132),B,PSE
T
830 PUT(136,120)-(144,132),B1,PS
ET
840 PUT(88,87)-(96,99),C1,PSET
850 PUT(80,87)-(88,99),C1,PSET
860 PUT(160,87)-(168,99),C1,PSET
870 PUT(168,87)-(176,99),C1,PSET
880 PUT(126,36)-(134,48),D,PSET
890 PUT(126,144)-(134,156),D,PSE
T
900 PUT(126,93)-(134,105),H,PSET
999 GOTO20
1000 GOTO1000
```

Color Computer I, II, III

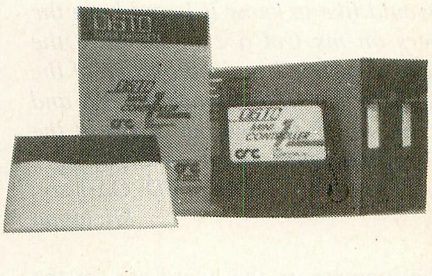
Free Software for Drive 0 Systems

CoCo Checker...Test roms, rams, disk drives and & controller printer, keyboard cassette & more.
Tape/Disk Utility...Transfers disk to tape and tape to disk.

159^{95} Drive 0
- Full Ht Drive
- Single Case
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & manuals

179^{95} Drive 0
- Double Sided Slim Line Drive
- Case holds 2 slim line drives
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & Manuals

269^{95} Drive 0 & 1
- 2 Double Sided Slim Line Drive
- Case holds 2 slim line drives
- Heavy Duty Power Supply
- 2 Drive Cable
- Gold plated contacts
- Controller & Manuals



Other Drive Specials

119^{95}
2nd Drive
for new Radio Shack
includes:
- Slim Line DS/DD Drive
- Cabling & Instructions
- Mounting Hardware

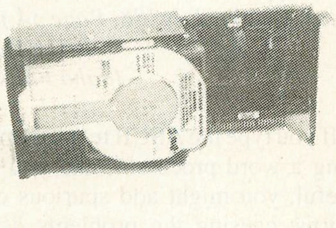
Full Ht Drive	89^{95}
Full Ht Drive Ps/Case	129^{95}
Slim Line Drive	99^{95}
Slim Line Drive Ps/Case	139^{95}
2 Slim Drives Ps/Case	239^{95}
Disk Controller	59^{95}

Single Ps & Case	44^{95}
Dual ½ht Ps & Case	54^{95}
Dual Full Ht. Ps & Case	79^{95}
Disk Controller	59^{95}
10 Diskettes with free library case	9^{95}

Quality Add-On's for Tandy 1000, SX, TX, SL, TL, 3000, 4000

HARD CARDS

10 meg	259.95
20 meg	299.95
30 meg	349.95
40 meg	399.95
49 meg	499.95
64 meg	599.95



HARD DRIVE KITS

10 meg kit	249.95
20 meg kit	299.95
30 meg kit	339.95
40 meg kit	399.95
60 meg kit	539.95

1000, 1000A,
Memory Cards

Zucker Memory
- DMA & 512K

CALL

Zucker Multifunction
- Serial
- Real Time Clock
- 512K DMA
- Software

CALL

TANDY 1000
1000, SX, TX, 3000, 4000
2nd Floppy

360K	TEAC	$119.95
720K	Mitsubishi	$99.95
3½"	Mitsubishi	$119.95

1000, 1000A, SX, TX, SL, TL
Hard Drive Controller
Will run 1 or 2
Hard Drives
Supports drives up to 120 megabytes
$99.95

QUALITY
CUSTOMER SERVICE
508-278-6555

TECHNICAL ASSISTANCE
508-278-6556

TOLL FREE ORDER LINE
1-800-635-0300
TRUE DATA PRODUCTS
115 MAIN ST., P.O. BOX 347
UXBRIDGE, MA 01569
508-278-6555
HOURS: MON-FRI. 9-6, SAT. 10-4 (EST)

CORPORATE P.O.'S WELCOMED

ALL PACKAGES SHIPPED UPS
EXCEPT CANADA AND A.P.O.'s
C.O.D.'S ADD $2.30
MASTER CHARGE/VISA ADD 3%
1 YEAR WARRANTY UNLESS
OTHERWISE NOTED
PRICES TERMS CONDITIONS
SUBJECT TO CHANGE WITHOUT
NOTICE

DOCTOR Q&A ASCII

By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

Memory Jumpers

I would like to know if I could use the jumpers on my CoCo 2 to increase the memory to 64K? I noticed on one of the chips, there is a section marked 128K and 64K, and there are two bar strips in the middle of the board. What are they for?

Darrell D. Garrison
Michigan

The jumpers on the board are for the different-sized ROMs in bits (64K — 8K times 8 for Color BASIC, and 128K — 16K times 8 for Disk Color BASIC). See Marty Goodman's *Upgrading CoCo's Memory* in the March '89 issue to upgrade your memory to 64K.

AND . . .

I have been programming for eight years now. Every once in awhile I come across a program that uses `AND` *in a strange way, that is,* `4 AND 2`. *What is the purpose of this?*

Terry Ritchie
Havelock, North Carolina

What you describe is a logical or *Boolean* `AND`. For example, suppose `X=45` (which in binary is 00101101) and `Y=35` (binary 00100011), were `AND`ed together (Note: `1 AND 1 = 1,1 AND 0 = 0,0 AND 1 = 0,0 AND 0 = 0`) as follows:

```
0 0 1 0 1 1 0 1 <-X
| | | | | | | |
0 0 1 0 0 0 1 1 <-Y
```

we get:

```
0 0 1 0 0 0 0 1
```

which is 33 decimal. This type of arithmetic is used for both speed (faster than multiplication and division) and convenience when manipulating registers.

Oops!

Regarding your answer to M. Willingham in THE RAINBOW, *February '89, I've tried and tried to get it to work, but always get a TM Error in Line 5010. Is there a typographical error in the listing?*

Rand Boland
Arvada, Colorado

Sorry for the typo. The = following the quote in that line should really be a +, the non-shifted character on the same typewriter key.

Citizen Arrest

I bought a CoCo 3 three months ago and have a Citizen 120-D printer that is Epson-compatible. I'm interested in printing graphics, and so bought DeskMate 3. *The problem is, it won't print the graphics. Is* DeskMate 3 *compatible with my printer? If not, is there a fix in* DeskMate 3, *or is the problem in the arrangement of the SW-1 (eight microswitches)? I also typed the program* `DUMPBAS` *(*RAINBOW, *September '88, Page 98) and it doesn't work either. I hope you can help me.*

Jorge Lopez Rodriguez
Guadalajara, Jalisco, Mexico

Tandy, with a few exceptions, releases all CoCo graphics programs with drivers for Tandy/Radio Shack printers that recognize a different set of graphics codes than the more common Epson/IBM-compatible printers. The Tandy printers print a row of graphics seven dots high while the Epson/IBM printers do eight at a time. The high order-bits correspond to the opposite pins in the two protocols. It should be apparent,by now, that fixing these programs for your printer is not a simple task, but involves almost a complete rewrite of the printer drivers.

Pin-out Figures

Is there a way of making my CoCo disk drive (FD 502) work on any of the Tandy IBM-compatibles?

Dennis Craig
La Vista, Nevada

CoCo floppy-disk drives are hardware-compatible with the IBM standard. If you cannot figure out the pin-outs, keep in mind that you can order a maintenance manual for any Tandy product from Radio Shack National Parts.

Editor Troubles

I've been having some trouble with my CoCo 3 and the `EDIT` *command. When I am editing a program that has been saved in the ASCII format,* `EDIT` *refuses to recognize lines that* `LIST` *fine, but get a* UL (Unidentified Line) *Error with* `EDIT`. *This problem also occurs when I try to edit a program that was saved in ASCII format, but is now in* BASIC. *What is going on here? Also, what is the proper poke and counter-poke for high speed on the CoCo 3? (These pokes appear in Marc Campbell;s* BASIC *editor,* Buddy, *July '88, Page 34.)*

Brian Davidson
Idaho Falls, Idaho

If you type the ASCII text for a program using a word processor, and you are not careful, you might add spurious carriage returns, causing the problems described above. The pokes are Speed up: `POKE &HFFD9,0`, and Slow back down: `POKE &HFFD8,0` .

Screen Sizing

I am presently using a CoCo 3 with a Magnavox Amber Monitor, and a Tandy Direct-Connect Modem Pak. Is it possible to change my screen size to a 40-by-24, instead of the 32-by-16 that I get when I access my modem?

Donald Nelson
Indianapolis, Indiana

The 32-by-16 screen is programmed into the Pak's ROM. Using *Mikeyterm*, available on tape or disk (See April's column.), can give you the resolution you want.

Direct-Connect Commy

Is there any way to use Tandy's DCM-3

Richard Esposito is the principal engineer for BDM Corporation. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.

Direct-Connect Modem with the Commodore 128? Also, I heard of a graphics tablet that Tandy used to make. Where can I find this?

Ian Coveny
Warsaw, New York

The Commodore has a strange non-standard serial port. (See Marty Goodman's April column for details.) Tandy used to sell an X-Pad for $349. They were closed out at Radio Shack stores for $99 over two years ago. I doubt that you can find any available.

A Better Spreadsheet?

I am currently using DynaCalc *for my spreadsheet purposes and am able to say that I am quite impressed and pleased. Just out of curiosity, are you aware of a better spreadsheet, maybe one that compares to* Lotus *that is compatible with OS-9 Level II? Also, what can I do to expand the memory capability of* DynaCalc *to take advantage of my 512K and how can I get rid of the extra linefeed during printout? The manual says any value up to and including eight.*

John Wilson
Las Vegas, Nevada

DynaCalc is currently OS-9's best. There are very few OS-9 programs accessing more than 64K each, primarily because Tandy/Microware has never released a large memory version C compiler for the CoCo. Check the output of `xmode /p` to make sure it is set at `-lf`. Also check the settings on your printer. You can also get double spacing if you print a line larger than your printer is capable of and it wraps.

Tricky Tracks

I just purchased an FD 502 drive. On OS-9, I configured my system to 40 tracks. While in a 40-track setup, I tried to make a copy of my system master. When OS-9 read off of the 35-track system master, it gave me a Read Error (Error 244). I tried copying the system master in 35-track setup, and when OS-9 started to write to the 40-track formatted disk, it gave me a Wrong Type Error (Error 249). How can I use 40-tracks? I'm puzzled.

Brennan A. Cropper
Port Barre, Louisiana

The way to make a 40-track system is to use `Config` from `/d0` to make a 40-track system on a 35-track formatted disk in `/d1`. Use the resulting disk to boot up again. Then format a new disk in `/d1`, use `Cobbler` on the disk in `/d1`, copy all files over to `/d1` and it will finally be your 40-track boot disk.

Disk Dilemma

I have a CoCo 2 (Model 26-3026). When I try any disk commands, the disk drive goes on and runs and will not stop! The disk-drive light will not go on either. I have tried the disk controller and drive on my other CoCos and have no trouble with it. The CoCo works good with cassette and ROM Pak programs plugged-in, with no trouble. Extended Color BASIC programs run fine, which I think tells me the ECB ROM chip is working. What components can I check?

Ned Bassick
Fairfield, Connecticut

The CoCo 2 does not supply 12 volts at the ROM port, as the older, larger CoCos did. It sounds like the controller is for one of them. The solution is to get a newer five-volt-only controller, a Multi-Pak Interface, which supplies the 12 volts, or kludge up a 12-volt source.

Patch Patching

In the January '88 issue, Page 55, you printed a patch for Disk EDTASM, *by Roger A. Krupski. I had to make two changes to his program before it would work with my CoCo 3:*

```
335  GOTO  350
610  DATA END,0
```

Without these added lines, I got a Disk Full Error, and an SN (Syntax) Error in Line 480.

Lt. Day
Zanesville, Ohio

Thanks for sharing the info.

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.

One-Liner Contest Winner . . .

Issue commands to your CoCo 3's cassette recorder with this one-liner, which controls the audio and motor functions. Press F1 to turn on audio and motor; press F2 to turn them off. Press ALT to `CLOAD` the program; press CTRL to `CLOADM` the program.

The listing:

```
10 CLS:PRINT@128,"                 F1=ON
 F2=OFF                     ALT=CLOAD
 CTRL=CLOADM":IFPEEK(343)=191THE
NAUDIOON:MOTORON:GOTO10ELSEIFPEE
K(344)=191THENAUDIOOFF:MOTOROFF:
GOTO10ELSEIFPEEK(341)=191THENCLO
AD:GOTO10ELSEIFPEEK(342)=191THEN
CLOADM:END:GOTO10ELSE10
```

Paul Fogle
Mountain Grove, MD

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape.*)

One-Liner Contest Winner . . .

After prompting the user for a beginning and ending address, this short utility prints the addresses and their contents to the screen. If the `PRINT` command is changed to `PRINT#-2`, the information will be sent to the printer.

The listing:

```
10 CLS:PRINT@11,"PRINT PEEK":PRI
NT:INPUT"TO LIST THE 'POKED' VAL
UES OF A RANGE OF ADDRESSES, INP
UT (B)   BEGINNING, (E) ENDING A
DDRESS.  INPUT B,E";B,E:FORA=B T
O E:PRINT A PEEK(A);:NEXTA:PRINT
:PRINT:INPUT "DO AGAIN (Y/N):";P
$:IFP$="Y"THEN10ELSEEND
```

William L. Duke
Gardnerville, NV

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape.*)

What your CoCo was really meant for.

Expanding Horizons

Take your CoCo beyond the limits of floppy diskettes — connect to DELPHI, your **complete online business and personal resource.** With your modem and a local phone call, select from tens of thousands of downloadable programs, meet friends from across the globe, or tap into the world's most comprehensive databases to expand the horizons of your CoCo.

Your Resource for Color Computers

DELPHI's special group for owners of Tandy Color Computers is supported by the people who bring you *RAINBOW* Access extensive databases where you can upload your favorite files and download programs written by other personal computer enthusiasts. Chat with other members and resident experts in Conference, use electronic mail, and post or respond to messages in Forum.

OS–9 Online

In OS–9 Online, DELPHI's interest group for fans of the OS–9 operating system, you'll meet other members, download files, and get tips to help you make the most of your CoCo.

RAINBOW Online

DELPHI is your online connection to *RAINBOW*. You can renew your subscription, meet other Color Computer owners, order software or hardware, or inquire about products. You can even download programs published in *RAINBOW*.

Wallet-Friendly

You can access DELPHI with a local phone call from almost anywhere in the United States. There is NO extra charge for using Tymnet or Telenet, NO monthly minimum, NO premium for 1200 or 2400 bps, and connect rates are a low $7.20/hour.

FREE Lifetime Membership

As a *RAINBOW* subscriber, you get a **FREE** lifetime DELPHI membership ($29.95 value) which includes a credit worth one evening hour of usage ($7.20).

If you don't already subscribe to *RAINBOW*, just request a subscription when you sign-up to DELPHI, and, for the $31 subscription fee, you'll get the same great deal!

Sign up now - Online!

With your CoCo and modem:

1. Dial 1-617-576-2981.*
2. Once connected, press RETURN once or twice.
3. At Username:, type **JOINDELPHI**
4. At Password:, type **RAINBOW**, if you already subscribe to *RAINBOW*. Type **SENDRAINBOW**, if you do not yet subscribe and wish to do so.
5. Have credit information ready.

* Or call DELPHI Member Services by voice at **(800)544-4005** to obtain a local access phone number.

No Risk

With DELPHI there is no risk. You can cancel your membership within 30 days and pay only for your usage beyond the initial one-hour credit.

DELPHI

The World's Premier Online Information Service

General Videotex Corporation • Three Blackstone St • Cambridge MA 02139
800-544-4005 • 617-491-3393

16K ECB

Building on last month's Calendar program

"Just Say Goodnight, Gracie"

By Fred B. Scerbo
Rainbow Contributing Editor

If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. *Remember, keep your ideas specific, and don't forget this is* BASIC. *All programs resulting from your wishes are for your use, but remain the property of the author.*

Just recently I finished reading George Burns' touching tribute to his late wife, *Gracie: A Love Story*. In it, a poker-faced George asked: "Gracie, how many days are there in a year?"

"Seven," she replied.

"Seven?" George questioned.

"Seven. Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday. If you know any more, George, just name them."

While I won't try to decipher the logic behind Gracie's innocent confusion, I thought it an interesting way to introduce this month's program: *Calendar II: The Days of the Week.*

It is not so much a sequel as much as a "prequel" to *Calendar*, but last's month's program was so much fun to write I couldn't help putting it out first.

Calendar I helps students identify the months of the year using graphic drawings. This month, we will concentrate on learning the days of the week. There are no fancy graphics, largely because I could not think of any to logically convey a specific day. (Sunday was easy, but Wednesday? Prince spaghetti day?)

As in recent months, this program helps fill a void in early childhood education computer software.

Calendar II is simple to operate. There are no menus or difficult instructions; to run the program, just press ENTER after seeing the titlecard. You are then presented with a screen titled "Days of the Week," with numbers one through seven highlighted in a row of boxes. When the first day, Sunday, appears, the number one flashes on the screen. Pressing ENTER advances the screen to the next day, continuing until the @ button is pressed. The days keep looping to impress upon the child that even though Sunday is the first day, it also follows Saturday from the previous week.

After pressing the @ key, the screen displays "Press the Number" and then gives a random day of the week. The child presses a number (1 to 7) that corresponds to the day shown. If the correct number is pressed, a row of smiling faces appears at the bottom of the screen; if incorrect, it shows a row of frowns.

Pressing ENTER allows you another shot at the day shown; pressing the @ key gives you the scorecard and pressing C continues, restarts or ends the program. That's all there is to it. Let your young ones try it along with *Calendar I*, to help them become more comfortable with the computer and keyboard. ❑

Fred Scerbo is a special needs instructor for the North Adams Publis Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

45	18	225	126
90	76	290	115
155	120	END	219

The Listing: WEEKDAYS

```
1 REM*****************************
2 REM*  THE DAYS OF THE WEEK     *
3 REM*   COPYRIGHT (C) 1989      *
4 REM*    BY FRED B. SCERBO      *
5 REM*    60 HARDING AVENUE      *
6 REM*  NORTH ADAMS, MA 01247    *
7 REM*****************************
8 CLEAR2000
9 CLS0
10 PRINTSTRING$(32,220);STRING$(
32,156);:FORI=1TO192:READA:PRINT
CHR$(A+128);:NEXT
15 PRINTSTRING$(33,128);:FORI=1T
O8:PRINTCHR$(205)CHR$(205)CHR$(2
00)CHR$(128);:NEXTI
20 FORI=1TO8:PRINTCHR$(204)CHR$(
204)CHR$(200)CHR$(128);:NEXT
25 PRINT@357,"  AN INTRODUCTION
TO  ";:PRINT@389," THE DAYS OF T
HE WEEK ";
30 PRINT@421,"    BY FRED B.SCERB
O   ";:PRINT@453," COPYRIGHT (C
) 1989  ";
35 DATA110,108,109,101,108,108,1
09,100,110,,96,109,108,109,100,1
11,,100,110,100,110,108,105,101,
108,108,109,100,110,108,108,109
40 DATA106,,,101,,,101,,106,,,10
1,,,,110,106,,106,,106,,101,101,
,,101,,106,,,101
45 DATA106,,,101,99,99,103,,106,
,,101,99,103,,106,109,,106,,106,
,101,101,99,99,103,,107,99,99,10
3
50 DATA106,,,101,,,101,,106,,,10
1,,100,,106,100,106,106,,106,,10
1,101,,,101,,106,100,98,
55 DATA106,,,101,,,101,,106,,,10
1,,96,,106,,108,106,,106,,101,10
1,,,101,,106,,100,98
60 DATA107,99,103,101,98,,103,97
,107,99,106,103,99,103,97,107,,9
7,107,97,107,99,102,101,98,96,10
```

```
3,97,107,,,101
65 X$=INKEY$:IFX$<>CHR$(13)THEN6
5
70 PMODE0,1:PCLS1:SCREEN1,1
75 FORI=0TO250STEP37:LINE(I,50)-
(30+I,80),PRESET,BF:NEXT
80 FORI=0TO250STEP37:LINE(I+4,54
)-(26+I,76),PSET,B:NEXT
85 DRAW"BM16,70C1S4U10NG2BR32R6D
5L6D5R6BR32R6U5NL4U5NL6BR30D5R6U
5D10BR32R6U5L6U5R6BR30NR6D10R6U5
NL6BU5BR32R6D4GD5"
90 DRAW"BM10,26C0R2NU12R10U12NL1
2BR6ND12R10D6NL10D6U12BR6F6NE6D6
BR12R8U6L8U6R8BR16ND12R10D12NL10
BR6U6NR8U6R8BR16R6ND12R6BR6D12U6
R10D6U12BR6NR8D6NR8D6R8BR16NU12R
8NU8R8NU12BR6NR8U6NR8U6R8BR6NR8D
6NR8D6R8BR6U12D6R2NE6F6"
95 COLOR1,0
100 LINE(0,0)-(252,2),PRESET,B
105 LINE(0,40)-(252,38),PRESET,B
110 LINE(0,0)-(2,40),PRESET,B
115 LINE(252,0)-(256,40),PRESET,
B
120 LINE(0,90)-(252,92),PRESET,B
125 LINE(0,144)-(256,192),PRESET
,BF
130 LINE(4,148)-(250,186),PSET,B
F
135 A$(1)="BR16R10U6L10U6R10BR6D
12R10NU12BR6U12F12NU12BR6":D$="R
2NU12R10U12NL12BR6ND12R10D6NL10D
6U12BR6F6NE6D6":A$(1)=A$(1)+D$
140 A$(2)="BR14U12R8ND12R8D12BR6
U12R10D12NL10BR6U12F12NU12BR6"+D
$
145 A$(3)="BR12U12L8R16BR6D12R10
U12BR6NR8D6NR8D6R8BR6R10U6L10U6R
10BD12BR6"+D$
150 A$(4)="NU12R6NU12R6NU12BR4NR
8U6NR8U6R8BR4R2ND12R8D12NL10BR4U
12F12U12BR4NR8D6NR8D6R8BR4R6U6L6
U6R6BD12BR4"+D$
155 A$(5)="BR10U12L6R12BR6D12U6R
8U6D12BR6NU12R8U12BR6ND12R8D6L6F
6BR6R8U6L8U6R8BD12BR6"+D$
160 A$(6)="BR24U6NR8U6R8BR6ND12R
8D6L6F6BR6NU12BR6"+D$
165 A$(7)="BR2R8U6L8U6R8BR6ND12R
8D6NL8D6U12BR6R6ND12R6BR6D12R8U1
2BR6ND12R8D6L6F6BR6"+D$
170 COLOR0,1
175 FORI=1TO7:LINE(0,100)-(256,1
34),PRESET,BF
180 DRAW"BM2,130C0S8":DRAW A$(I)
185 DRAW"BM4,131C0S8":DRAW A$(I)
190 Q=I*37-37
195 LINE(Q+4,54)-(26+Q,76),PSET,
B
200 LINE(Q+4,54)-(26+Q,76),PRESE
T,B
205 X$=INKEY$:IFX$=CHR$(13)THEN2
15ELSEIFX$="@"THEN225
210 GOTO195
215 NEXT
220 GOTO170
225 LINE(0,100)-(256,134),PRESET
,BF
230 LINE(6,6)-(248,34),PRESET,BF
235 W=RND(7):DRAW"BM2,130C0S8":D
RAW A$(W)
240 DRAW"BM4,131C0S8":DRAW A$(W)
245 DRAW"BM16,26S4U12R10D6NL10BR
4D6U12R10D6L6F6BR4NR10U6NR10U6R1
0BR4NR10D6R10D6NL10BR4R10U6L10U6
R10BR18ND12L6R12BR4D12U6R8U6D12B
R4NR8U6NR8U6R8BR16ND12F12U12BR4D
12R10U12BR4ND12R6ND12R6D12BR4R2N
U12R10U6NL10U6NL12BR4NR8D6NR8D6R
8BR4U12R10D6L6F6"
250 X$=INKEY$:IFX$="@"THEN315ELS
EIFX$=""THEN250
255 X=VAL(X$):IFX=0THEN250
260 IFX>7THEN250
265 FORP=1TO10:Q=X*37-37:LINE(Q+
4,54)-(26+Q,76),PSET,B:LINE-(Q+4
,54),PRESET,B:NEXTP
270 IF X=W THEN295
275 NW=NW+1:FORK=0TO200STEP40:CI
RCLE(28+K,168),20,0,.9:CIRCLE(28
+K,176),8,0,.9,.5,1:PSET(24+K,16
4,0):PSET(32+K,164,0):NEXTK
280 X$=INKEY$:IFX$=CHR$(13)THEN2
85ELSEIFX$="@"THEN315ELSE280
285 LINE(4,148)-(250,186),PRESET
,BF
290 GOTO250
295 NC=NC+1:FORK=0TO200STEP40:CI
RCLE(28+K,168),20,0,.9:CIRCLE(28
+K,170),8,0,.9,1,.5:PSET(24+K,16
4,0):PSET(32+K,164,0):NEXTK
300 X$=INKEY$:IFX$=CHR$(13)THEN3
05ELSEIFX$="@"THEN315ELSE300
305 LINE(4,148)-(250,186),PRESET
,BF
310 GOTO225
315 CLS:PRINT@101,"YOU TRIED"NC+
NW"TIMES &":PRINT@165,"ANSWERED"
NC"CORRECTLY"
320 PRINT@229,"WHILE DOING"NW"WR
ONG."
325 NQ=NC+NW:IF NQ=0THEN NQ=1
330 MS=INT(NC/NQ*100)
335 PRINT@293,"YOUR SCORE IS"MS"
%."
340 PRINT@357,"ANOTHER TRY (Y/N/
C) ?";
345 X$=INKEY$:IFX$="Y"THEN RUN
350 IFX$="N"THENCLS:END
355 IFX$="C"THENSCREEN1,1:LINE(4
,148)-(250,186),PRESET,BF:GOTO22
5
360 GOTO345
```

NOVICES NICHE

THE RAINBOW is a teaching environment and we realize that the majority of our readers will always be beginners. In our continuing effort to always keep the new user in mind, and in addition to the many beginner feature articles and programs published in every issue, "Novices Niche" contains shorter BASIC program listings that entertain as well as help the new user gain expertise in all aspects of the Color Computer: graphics, music, games, utilities, education, programming, etc.

Games

Left Beats Right
By Keiran Kenny

4K

Not long ago I read an article maintaining that left-handed people react about one-fiftieth of a second faster than right-handers in sports like tennis. I forgot the details of the scientific explanation, but if you look at the number of left-handers among the top-seeded and most successful tennis players, it seems that there is something to it.

Reaction lets you test the theory. A cursor appears at the top of the screen, and after a random period it drops down the screen. You are prompted to use your left and right hand alternately to stop it before it has dropped ten screen spaces. If you press the space bar before it starts to fall, you "jump the gun" and have to start again. Your score is 10 minus the number of screen spaces remaining if you stop it.

The loop in Line 140 holds the cursor at each position just long enough to make it visible. The value `DL` in Line 10 can be increased if you want.

Although I am right-handed, my left hand scored consistently better than my right. Now, if I can get some training in ambidexterity... see you at Wimbledon.

The Listing: `REACTION`

```
0 'REAXION' by Keiran Kenny,
  Sydney, 1989.
1 ' COPYRIGHT 1989  FALSOFT,INC
10 DL=2
20 FORT=1TO20:CLS0
30 IFT/2=INT(T/2)THEN50
40 PRINT"RIGHT HAND";:GOTO60
50 PRINT"LEFT HAND";
60 PRINT@16,CHR$(159);
70 GOSUB280
80 IFINKEY$=CHR$(32)THENPRINT@45
4,"YOU JUMPED THE GUN!";:GOSUB28
0:CLS0:GOTO30
90 PRINT@16,CHR$(128);:P=48:FORX
=1TO10
100 PRINT@P,CHR$(159);
110 PRINT@P,CHR$(128);
120 IFINKEY$=CHR$(32)THEN160
130 P=P+32
140 FORD=1TODL:NEXT
150 NEXT:X=X-1
160 IFT/2=INT(T/2)THEN180
170 SR=10-X:TR=TR+SR:PRINT@390,"
RIGHT SCORE"SR"/ 10";:GOTO190
180 SL=10-X:TL=TL+SL:PRINT@390,"
LEFT SCORE"SL"/ 10";
190 GOSUB280
200 K$=INKEY$:NEXTT
210 CLS0:PRINT@228,"RIGHT SCORE"
TR"/ 100";
220 PRINT@260," LEFT SCORE"TL"/
100";
230 PRINT@326,"TRY AGAIN? Y/N";
240 K$=INKEY$:IFK$=""THEN240
250 IFK$="Y"THENTR=0:TL=0:GOTO20
260 IFK$="N"THENCLS:END
270 GOTO240
280 FORD=1TO300+RND(600):NEXT:RE
TURN
```

Asteroid Dodge
By Clayton R. Moore

4K

In *Asteroid* you are allotted three ships. The object of the game is to avoid the asteroids (graphic blocks) coming up the screen toward you. Your ship (the letter V) is located at the top of the screen. Maneuver your position to the right or left using the joystick. Pressing the fire button clears the screen of all oncoming obstacles. Use this option sparingly to avoid impending disaster.

After accumulating 500 points you reach Level II. The entrance to Level II is a wall with a few openings stretching across the screen. Your goal is to pass through an opening without hitting the wall.

Levels continue to change every 500 points in a similar fashion. Additionally, more screen-clearing bombs are awarded on completion of each level. The score is shown at the end of the game. How far can you get?

The Listing: ASTEROID

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 '****************
20 '*ASTEROID DODGE*
30 '*      BY      *
40 '*   C. MOORE   *
50 '*  JULY  1988  *
60 '****************
70 L=1
80 P=16
90 POKE65495,0
100 CLS
110 X=JOYSTK(0)
120 IF X>37 THEN A=1 ELSE IF X<2
5 THEN A=-1 ELSE A=0
130 IF P+A<0 THEN A=0 ELSE IF P+
A>31 THEN A=0
140 P=P+A
150 PRINT@P,"V";
160 FORI=1TOL
170 PRINT@ RND(32)+447,CHR$(RND(
127)+128);
180 NEXT I
190 PRINT@480
200 IF PEEK(1056)+P=175 THEN M=M
+1
210 IF PEEK(1056+P)<>96 THEN 290
220 IF C<-3 THEN 250
230 IF PEEK(65280)=126 THEN CLS:
C=C-1
240 IF PEEK(65280)=254 THEN CLS:
C=C-1
250 SC=SC+1
260 L1=L1+1
270 IF L1=500 THEN L=L+1:L1=0:SO
UND 1,1:GOTO 430
280 GOTO110
290 POKE65315,63
300 FORI=1TO75
310 PRINT@P,CHR$(RND(127)+128);
320 POKE65312,RND(255)
330 NEXT
340 CLS
350 M=M-1
360 C=0
370 IF M=-3 THEN 390
380 GOTO110
390 CLS
400 PRINT@108,"gameover";
410 PRINT@140,"SCORE";SC
420 END
430 CLS
440 FORI=447TO479
450 PRINT@I,CHR$(128);
460 NEXT
470 FORI=1TO6
480 PRINT@RND(32)+447," ";:
490 NEXT
500 GOTO110
```

Elevators
By Paul Nalos

16K
ECB

In this game you are a red dot, maneuvered with the right joystick. The object of the game is to keep from going off the screen limits. The dot jumps if you press the fire button and responds to right and left movements of the joystick accordingly.

The Listing: ELEVATOR

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 L=2
20 C=2
30 CLS0
40 GOSUB 290
50 L=L+1:IF L>31 THEN L=0
60 E=L-1:IF E=-1 THEN E=31
70 FOR DR=0 TO 5
80 DI=DR
90 IF EL=1 THEN GOSUB 170:GOTO 1
60
100 SET(DI,L,C)
110 RESET(DI,E)
120 SET(63-DI,31-L,C)
130 RESET(63-DI,31-E)
140 SET(31-DI,31-L,C):RESET(31-D
I,31-E)
150 SET(32+DI,L,C):RESET(32+DI,E
)
160 NEXT DR
170 IF Y=32 OR Y=-1 THEN PLAY"GC
":END ELSERESET(X1,Y1):X1=X:Y1=Y
:SET(X,Y,4)
180 IF Y=31 THEN Y=Y+1:GOTO 170
190 IF POINT(X,Y+1)<>0 THEN Y=Y-
1:GOTO 170
200 IF Y=30 THEN Y=Y+1:GOTO 170
210 IF POINT(X,Y+2)=0 THEN Y=Y+1
:GOTO 170
220 IF JOYSTK(0)>50 THEN X=X+2
230 IF JOYSTK(0)<10 THEN X=X-2
240 P=PEEK(65280):P=P OR 128
250 IF P<>255 THEN Y=Y-1
```

```
260 IF X>63 THEN X=63
270 IF X<0 THEN X=0
280 GOTO 50
290 REM SCENE
300 FOR Y=0 TO 31 STEP 6
310 FOR X=0 TO 63
320 SET(X,Y,8)
330 NEXT X,Y
340 X=0:Y=0
350 RETURN
```

Wordmake
By Logan Bleckley, III

4K

WordMake lists 20 letters on the screen from which you try to form 10 words at least four letters long. Being a short program, no spell-checker is incorporated into the game. Your score is shown after 10 words have been spelled.

The Listing: WORDMAKE

```
0 ' COPYRIGHT 1989  FALSOFT,INC
2 '"WORDMAKE" BY LB..10/88
3 ONBRK GOTO200
4 Z=RND(100):FORQ=1TO2:Y=RND(100
):NEXTQ:CLS
5 PRINT@33,"CAN YOU MAKE 10 WORD
S OF THIS?"
6 PRINT"2&3 LETTER WORDS NOT ALL
OWED!"
8 FORQ=1TO15
10 A=RND(26)+64
20 B$=B$+CHR$(A)
30 NEXTQ
40 PRINT@102,B$+"AEIOU"
50 '
60 FORQ=1TO10
70 PRINTQ;:INPUT">";C$
72 D=LEN(C$):IFD=4THENF=F+10
73 IFD<4THEN70
74 IFD=5 THEN G=G+15
76 IFD=6 THEN H=H+20
78 IFD>6 THEN J=J+30
80 NEXTQ
82 SC=F+G+H+J:PRINT"<<<SCORE>>>"
,SC"!!!"
90 PRINT"GOOD!!AGAIN? HIT[ENTER]
"
100 INPUTZ:RUN
110 CLS:LIST
200 END
```

Home Help

Diary
By Bradley Hurt

CoCo 3
Disk

This program helps you keep a personal diary. Type in the listing, then save it and run the program. At the prompt "What Month?" enter a month, using a maximum of eight characters. This creates a filename. The next prompt is "What Day?". Type in the day, creating the filename extension. Now you will see either "This month doesn't exist!" or the diary page already created for that date. If the month doesn't exist, press the Y key to create a file. At the "Dear Diary" screen, enter your message of the day. File length is limited to eight lines of text minus seven characters.

The Listing: DIARY

```
0 CLEAR 2000
1 ' COPYRIGHT 1989  FALSOFT,INC
5 POKE &H95C9,87:POKE 65314,20:P
ALETTE 13,63
10 ON ERR GOTO 85
15 ON BRK GOTO 80
20 CLS:L$=" "
25 PRINT"<------------<DIARY>----
-------->< -------------->BY<-----
-------->----------=<BRAD HURT>=
---------";
30 PRINT"WHAT MONTH?":LINE INPUT
 M$:PRINT"WHAT DAY?(EX 025)":LIN
E INPUT DAY$:GOSUB 45
35 GOTO 20
40 CLS:PRINT"DEAR DIARY,";CHR$(1
3);LAG$;CHR$(13);"ANY KEY TO CON
TINUE ":EXEC 44539:CLOSE#1:RETUR
N
45 OPEN"D",#1,M$+"/"+DAY$
50 FIELD#1,255 AS L$
55 IF LOF(1)<1 THEN 60 ELSE 40
60 CLOSE#1:OPEN"D",1,M$+"/"+DAY$
,255:FIELD#1,255 AS L$:PRINT"THI
S MONTH DOESN'T EXIST!":PRINT"DO
 YOU WANT TO START THIS MONTH (Y
/N)?";:EXEC 44539:IF INKEY$="N"
THEN CLOSE#1:KILL M$+"/"+DAY$:RE
TURN ELSE GOTO 65
65 'START NEW DAY OF MONTH
70 CLS:LINE INPUT"DEAR DIARY,
                   ";LAG$
75 LSET L$=LAG$:PUT#1,2:CLOSE#1:
RETURN
80 PRINTCHR$(13);"ARE YOU SURE (
Y/N)?";:EXEC 44539:IF INKEY$<>"Y
" THEN GOTO 20 ELSE CLOSE#1:END
85 IF ERNO=31 THEN RUN
90 IF ERNO=1 THEN PRINT"?SN ERRO
R IN ";ERLIN:END
95 IF ERNO=28 THEN PRINT"DISK FU
LL ERROR";:EXEC 44539:RUN
100 IF ERNO=26 THEN RUN
105 PRINT"?UNDEFINED ERROR IN LI
NE ";ERLIN:END
```

Utilities

Disks Named "Miscl"
By Merle Miller

16K
Disk

Are there others of you out there who have a bunch of disks named "MISCL?" I had so many, one of my early wishes was for a listing on paper of the programs on each disk. There are plenty of programs to provide this, but each always has some little something I don't like.

Over a period of time, and with bits and pieces from RAINBOW, I put together *MM DIR*. It makes a hard copy of your miscellaneous programs on disks, saving you time when looking for a specific program. Set the printer at 1200 baud or change the rate in Line 20 to suit your needs.

The Listing: `MMDIR`

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 'THIS IS "MM DIR" W/A$,B$,C$,
X$,Y$,Z$
20 POKE150,40
30 PRINT"DISK NAME/#":INPUTX$:PR
INT"CAT.NO.":INPUTZ$:PRINT"DATE
":INPUTY$:PRINT"PRINTER READY?(Y
)":INPUTA$:PRINT#-2,CHR$(30);"DI
SK ";X$;" - CAT# ";Z$;" DATE ";Y
$:POKE111,254:DIR:PRINT:PRINT"FR
EE GRANS":POKE111,254:PRINTFREE(
0)
40 PRINT"DO YOU WANT TO ADD NOTE
S?  (Y/N)"
50 INPUT A$
60 IF A$="Y"THEN 70 ELSE END
70 CLS:WIDTH40:LOCATE2,2:PRINT"E
NTER 80 CHAR.MAX. FOR EACH LINE"
:LOCATE8,3:PRINT"USE HYPENS-NOT
COMMAS":LOCATE2,8:PRINTB$:INPUTB
$:PRINT#-2,B$:LOCATE3,20:PRINT"W
ANT ANOTHER LINE?":LOCATE3,22:PR
INT"(Y/N)":INPUT C$:IFC$="Y"THEN
 70 ELSE END
```

Sound Control
By Joel Hegberg

64K

Sound Control is a short program that allows you to toggle sound output on and off in BASIC. It multitasks using BASIC's interrupts so you don't know it's there until you use `SOUND`, `PLAY`, or `AUDIO` commands.

Simply enter the program into your Color Computer, save it, and then run it. The program searches for typing errors in the `DATA` statements and notifies you of needed corrections. Remember to resave the program if you make any changes. Once the program is running perfectly, a message appears displaying, "Sound Control Is Now Installed." To disable and enable sound, press the CTRL and S keys at the same time. This is very useful for playing noisy programs when everyone's asleep.

Sound Control should work on any Color Computer with the newer keyboard (like the one the CoCo 3 comes with) and at least 64K of memory. If you are using a CoCo 1 or 2, first run a ROM-RAM converter program like the one on Page 157 of the May '88's issue of THE RAINBOW (Listing 3). Also, for CoCo 1 and 2 users, pressing the Reset button disables the program. Simply type in `POKE 65503,0` and it is re-enabled.

The Listing: `SNDCTRL`

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 'SOUND CONTROL
20 'CREATED FEBRUARY 2, 1989 BY
30 'JOEL MATHEW HEGBERG
40 '936 NORTH TWELFTH STREET
50 'DE KALB, ILLINOIS  60115
60 '
70 '
80 CLEAR500,32700:CLS:IFPEEK(269
)*256+PEEK(270)=32702THENPRINT"S
```

```
OUND CONTROL ALREADY INSTALLED."
:END
90 TL=0:LT=0:T=32700:LN=0:RESTOR
E
100 READA$
110 IFLEN(A$)=3THEN150
120 IFA$="**"THEN180
130 A=VAL("&H"+A$):POKET,A:LT=LT
+A:TL=TL+A
140 T=T+1:GOTO100
150 A=VAL("&H"+A$)
160 IFA<>LT THEN PRINT"DATA ERRO
R IN LINE #";LN+240:STOP
170 LT=0:LN=LN+10:GOTO100
180 READ A$:A=VAL("&H"+A$)
190 IFA<>TL THENPRINT"ERROR IN D
ATA STATEMENTS.":STOP
200 PCKE521,PEEK(269):POKE522,PE
EK(270)
210 FORT=1000TO1006:READA:POKET,
A:NEXTT:EXEC1000
220 CLS:PRINT"SOUND CONTROL IS N
OW INSTALLED."
230 END
240 DATA FF,0,34,76,B6,1,56,81,B
F,27,9,7F,7F,524
250 DATA BD,35,76,6E,9F,2,9,B6,1
,55,81,FB,26,52E
260 DATA F0,B6,7F,BD,26,EE,43,B7
,7F,BD,B6,7F,761
270 DATA BC,43,B7,7F,BC,81,FF,27
,7,86,39,B7,A9,6BE
280 DATA A2,20,7,86,CE,B7,A9,A2,
86,86,B7,A9,76,701
290 DATA 20,CC,**,205E
300 DATA 142,127,190,191,1,13,57
```

Graphics

Simple Draw

By Darren Day

16K Disk
Cassette
Modification

Simple Draw is a bare-bones drawing program created to work with all CoCos. Commands are simple to use and the listing is fairly simple to understand.

The joysticks are used to position the graphics cursor on the desired screen position. The fire button sets a point on the screen, and the C key clears a point on the screen. The CLEAR key clears the whole screen, the S key saves a whole screen on a disk (or cassette) file named `SCREEN`, and the L key loads the `SCREEN` file into memory (the screen).

While you probably won't get a picture printed in "The CoCo Gallery" using this program, it still can be used to create interesting title screens for your programs. Just insert a program line such as:

```
10 LOADM"SCREEN":EXEC
```

Simply press a key to continue the program. I hope that this program will be helpful and enjoyable.

The Listing: `SIMPLDRA`

```
0 ' COPYRIGHT 1989  FALSOFT,INC
5 '       SIMPLE DRAW
        DARREN B. DAY
          JULY 1988
10 'FOR CASS. I/O CHANGE SAVEM
   TO CSAVEM & LOADM TO CLOADM
   IN LINE 35.
15 CLS(0)
20 X=JOYSTK(0):Y=INT(JOYSTK(1)/2
)
25 IF PEEK(65280)=126 OR PEEK(65
280)=254 THEN SET(X,Y,5)
30 A$=INKEY$
35 IF A$="C" THEN RESET(X,Y) ELS
E IF A$=CHR$(12) THEN RUN ELSE I
F A$="S" THEN SAVEM "SCREEN",102
4,1536,44539 ELSE IF A$="L" THEN
 LOADM "SCREEN"
40 IF POINT(X,Y)=5 THEN 20
45 SET(X,Y,5):SOUND 255,1:RESET(
X,Y):GOTO 20
```

Submissions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one screen sitting and are useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we cannot key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

RAINBOW

Give us your best: Join the ranks of these courageous CoCoists in showing the Color Computer world your high score at your favorite micro-diversion. We want to put your best effort on record in THE RAINBOW's bimonthly "Scoreboard" column. All entries must be received 60 days prior to publication. Entries should be printed — legibly — and must include your *full* name, address, game title, company name and, of course, your high score. Each individual is limited to three score entries per month. Send your entries to Scoreboard, c/o THE RAINBOW.

For greater convenience, your high scores may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`.

★ Current Record Holder ● Shutout

ADVANCED STAR*TRENCH (THE RAINBOW, 7/86)
4,750 ★Stephane Martel, Laval, Quebec
4,500 Frankie DiGiovanni, Olney, MD
4,475 David Schaller, Clarkston, WA
ANDRONE *(Radio Shack)*
20,820 ★Gary Budzak, Westerville, OH
ASTRO BLAST *(Mark Data)*
49,356 ★Brian S. Brame, Lakeside, CA
48,825 Tony Bacon, Mt. Vernon, IN
24,980 Matthew Smith, Courtenay, British Columbia
ATOM *(Radio Shack)*
Round 2 Cobalt (#24) James Donegan, Saurgerties, NY
BASH *(SRB Software)*
744,900 ★Andy Carter, North Charleston, SC
BEAM RIDER *(D & D Software)*
1,062,400 ★Rose Snyer, Cincinnati, OH
673,160 ★James Snyer, Cincinnati, OH
BEE ZAPPER (THE RAINBOW, 9/87)
28,275 ★William Currie, Bryans Road, MD
15,785 David Hartmann, Osoyoos, British Columbia
12,825 Frederick Lajoie, Middleton, Nova Scotia
BIOSPHERE *(Radio Shack)*
64,000 ★Ty Stocksdale, Racine, WI
BLITZ (THE RAINBOW, 6/88)
126,400 ★Jerry Anderson, Jacksonville, FL
69,150 Ryun Schlecht, Gackle, ND
63,150 Kreig Bryson, Woodstock, GA
BOUNCING BOULDERS *(Diecom Products)*
24,186 ★Dennis Zobel, Centereach, NY
16,874 Michael Zobel, Centereach, NY
10,930 Patrick Garneau, Ste-Croix, Quebec
BREWMASTER *(NOVASOFT)*
51,925 ★Wendy Staub, Moundsville, WV
CASHMAN *(MichTron)*
9,870 ★Martin Parada, Arcadia, CA
CAVEWALKER *(Radio Shack)*
209,870 ★Todd Von Natta, Isle of Palms, SC
34,720 Chris Kremo, Bethel, CT
30,309 Cathy England Kimble, Glendale, AZ
CLOWNS & BALLOONS *(Radio Shack)*
688,960 ★Faye Keefer, Augusta, GA
217,500 Frankie DiGiovanni, Olney, MD
70,180 Charles Andrews, Delta Jct, AK
COLOR BASEBALL *(Radio Shack)*
596-0 ★●Frank C. D'Amato, Brooklyn, NY
595-0 ●Tom Cherubino, Brooklyn, NY
412-0 ●Brian S. Brame, Lakeside, CA
389-0 ●Wes Latimer, Grangeville, ID
387-0 ●Joel Stocksdale, Racine, WI
276-0 ●Kevin Wannemacher, Payne, OH
238-0 ●John Valentine, Marlborough, CT
172-0 ●Ryan Murray, Herrin, IL
149-0 ●John Breckel, Wilmington, OH
137-0 ●Scott Galvao, Tiverton, RI
137-0 ●Jennifer Johnson, Meriden, CT
132-0 ●Karen Rimiller, Adams, NY
130-0 ●Matthew Snider, Pinehurst, TX
130-2 Greg Allen, Atwater, CA
126-0 ●Jason Trammel, Murphysboro, IL
113-0 ●Chris Donato, Euclid, OH
COLOR CAR *(NOVASOFT)*
343,075 ★Duncan Cameron, Chippewa Falls, WI
316,550 Alan Martin, Cornwall, Ontario
COLOR POKER (THE RAINBOW, 4/83)
100,107,600 ★Earl Foster, Lynchburg, VA
THE CONTROLLERS (THE RAINBOW, 2/88)
365 ★Roger Rance, Charleston, SC
308 Erin Carlton, Charleston, SC
CRYSTAL CASTLES *(Thunder Vision)*
516,220 ★Jason Trammel, Murphysboro, IL
DALLAS QUEST *(Radio Shack)*
81 ★Brad Wilson, Lithia Springs, GA
85 Paul Summers, Orange Park, FL
85 David and Shirley Johnson, Leicester, NC
86 Roy Grant, Toledo, OH
86 Melanie Moor, Florence, AL
86 Curtis Trammel, Murphysboro, IL
DEF MOV (THE RAINBOW, 1/87)
50,566 ★Frankie DiGiovanni, Olney, MD
43,806 Domingo Martinez, Miami, FL
39,320 Matthew Smith, Courtenay, British Columbia
DEMOLITION DERBY *(Radio Shack)*
113,200 ★Gary Budzak, Westerville, OH
100,500 Richard Winkelbauer, Bronx, NY
DEMON ATTACK *(Imagic)*
279,435 ★Jon Hobson, Plainfield, WI
202,260 Tom Briggs, Hillsdale, NY
89,285 Upton Thomas, Arnold, MD
DESERT PATROL *(Arcade Animation)*
631,450 ★Chris Lucero, Denver, CO
505,250 Ricky Turkett, Marlow, OK
234,300 Steven Turcotte, Matane, Quebec
DESERT RIDER *(Radio Shack)*
80,703 ★Thomas Payton, Anderson, SC
68,353 Mike Alt, San Juan Capistrano, CA
65,351 Jason Hackley, Clinton, CT
DEVIL ASSAULT *(Tom Mix)*
1,866,100 ★Stephane Martel, Laval, Quebec
623,550 Dale Krueger, Maple Ridge, British Columbia
DOWNHILL (THE RAINBOW, 1/89)
10 ★James Donegan, Saugerties, NY
10 ★Ryun Schlecht, Gackle, ND
DOWNLAND *(Radio Shack)*
125,450 ★Pat Norris, O'Fallon, MO
99,982 Eric Mellon, Newark, DE
99,980 Danny Wimett, Rome, NY
DRACONIAN *(Tom Mix)*
137,810 ★Chris Lucero, Denver, CO
127,870 Michael Mullen, Buffalo, NY
DRAGON FIRE *(Radio Shack)*
160,835 ★Eric Olson, Wheaton, IL
146,325 Stephane Martel, Laval, Quebec
FIRESTORM (THE RAINBOW, 1/86)
22,505 ★Chad Presley, Luseland, Saskatchewan
11,250 Stephane Martel, Laval, Quebec
5,680 Kathy Rumpel, Arcadia, WI
5,180 Mark Brissie, Nashville, TN
GALACTIC ATTACK *(Radio Shack)*
31,100 ★Upton Thomas, Arnold, MD
29,030 David Czarnecki, Northampton, MA
26,370 Jeff Remick, Warren, MI
GALAGON *(Spectral Associates)*
751,020 ★Sofia Giorgi, Brasilia, Brazil
357,890 Jason Clough, Houston, TX
328,820 Bernard Burke, Lee's Summit, MO
GANTELET *(Diecom Products)*
65,398,298 ★Phil Wooding, Renovo, PA
45,235,820 Ken Hubbard, Madison, WI
23,643,720 Geran Stalker, Rivordalo, GA
GANTELET II *(Diecom Products)*
65,399,289 ★Corey Kepler, Renovo, PA
GANTELET II (continued)
17,701,060 Bryan Bell, Manassas, VA
55,015 Andy Freeman, Turtle Lake, WI
GFL CHAMPIONSHIP FOOTBALL II *(Tandy)*
1,046-0 ★Mark E. Wentroble, Tyler, TX
825-0 Ryan Grady, Newbury Park, GA
83-3 Charles Reve de Cotret, Laurent, Quebec
GHANA BWANA *(Radio Shack)*
2,350,750 ★Michael Heitz, Chicago, IL
702,520 Joseph Delaney, Augusta, GA
400,000 Tom Jones, Milan, IL
282,070 Kelly Jones, West Salem, OH
174,410 Caraann Jentzsch, Dufur, OR
GIN CHAMPION *(Radio Shack)*
2,224-0 ★●Lee Deuell, Shell Rock, IA
1,602-0 ●Jimmy Garner, Ft. Worth, TX
1,120-0 ●Kim Johns, Port Cog., British Columbia
GRANDPRIX CHALLENGE *(Diecom Products)*
67,710 ★H. Dingwell, Litchfield, CT
GROBOT *(Children's Computer Workshop)*
9,665 ★Wendy Staub, Moundsville, WV
8,090 Curt Lebel, Louisville, KY
HELICOPTER HERO (THE RAINBOW, 3/88)
4,608 ★Jerry Anderson, Jacksonville, FL
103 Phil Holsten, Moraga, CA
76 Chris Nuwer, Lockport, NY
HITCHHIKER'S GUIDE TO THE GALAXY *(Infocom)*
400/359 ★Roy Grant, Toledo, OH
400/422 Jeff Holtham, Waterloo, Ontario
400/510 Brad Wilson, Lithia Springs, GA
IRON FOREST *(Diecom Products)*
5,671,500 ★Douglas Paulson, Richfield, ID
4,088,000 Gabriel Riley, Richfield, ID
3,173,200 Charles Boyd, Amarillo, TX
2,676,300 Janet Boyd, Amarillo, TX
1,376,850 Ricky Turkett, Marlow, OK
JOKER POKER (THE RAINBOW, 3/87)
62,067,906 ★Carole Rueckert, Mansfield, OH
47,505,822 Blain Jamieson, Kingston, Ontario
21,733,284 Jon Fogarty, Yale, MI
JUNIOR'S REVENGE *(Computerware)*
2,503,000 ★Stephane Martel, Laval, Quebec
257,600 Keith Cohen, Rocky Mount, NC
JUNKFOOD (THE RAINBOW, 11/84)
535,760 ★Charlie Ginn, Augusta, GA
356,850 Jon Hobson, Plainfield, WI
18,990 Joel Klein, Indianapolis, IN
KING PEDE *(T & D Software)*
83,855 ★Mike Snyder, Allen, OK
KNOCK OUT *(Diecom Products)*
472,995 ★Frank D'Amato, Brooklyn, NY
183,675 Rush Caley, Port Orchard, WA
KORONIS RIFT *(Epyx)*
188,250 ★Mario Zuvieta, McAllen, TX
186,710 Tony Harbin, Cullman, AL
KUNG-FU DUDE *(Sundog Systems)*
32,000 ★Tony Geitgey, University Park, PA
14,305 David Schulze, San Antonio, TX
12,150 Cody Deegan, Fallon, NV
THE LAIR *(Freebooter Software)*
112,940 ★James Walton, Pittsburgh, PA
LANDER *(T&D Software)*
780 ★Ari Enkin, Neapen, Ontario
LASER SURGEON: THE MICROSCOPIC MISSION *(Activision)*
42,767 ★Joe Stanley, Harrisburg, IL
LUNAR-ROVER PATROL *(Spectral Associates)*
73,500 ★Aron Wuelfing, Gladwin, MI

SCOREBOARD

LUNAR-ROVER PATROL (continued)
66,200 Chuck Lehotsky, N. Jackson, OH
45,700 Kameron Pence, Little Rock, AR
MARBLE MAZE *(Diecom Products)*
353,220 ★David Boland, Dubuque, IA
30,650 Amber Reynolds, White City, Saskatchewan
A MAZING WORLD OF MALCOLM MORTAR *(Radio Shack)*
7,545 ★Joshua Wanagel, Freeville, NY
7,155 Kreig Bryson, Woodstock, GA
7,035 Thomas S. Corbitt III, Yaupon Beach, NC
MEGA-BUG *(Radio Shack)*
12,000 ★Matthew Smith, Courtenay, British Columbia, Canada
10,044 Douglas Bacon, Middletown, CT
9,309 Alan Kramer, Cooksville, MD
MEMOCARDS (THE RAINBOW, 8/87)
3,120 ★Lise Gagne, St-David, Quebec
1,964 Scott Walotkiewicz, Tworivers, WI
1,640 Sara Mittelstaedt, Kiel, WI
MINE RESCUE (SRB Software)
670,200 ★Chuck Lehotsky, N. Jackson, OH
MISSION: F-16 ASSAULT *(Diecom Products)*
565,395 ★Tony Bacon, Mt. Vernon, IN
468,750 Karen Jessen, Cleveland, OH
355,570 Stirling Dell, Dundalk, Ontario
MISSION: RUSH'N ASSAULT *(Diecom Products)*
1,210,550 ★Robert Mefferd, Rockford, OH
787,300 Tony Bacon, Mt. Vernon, IN
361,750 Clay Jones, Wooster, OH
212,500 Kelly Jones, West Salem, OH
195,250 Kelly Jones, West Salem, OH
MONSTER MAZE *(Radio Shack)*
52,510 ★Chris Kremo, Bethel, CT
12,950 Paul DeVita, Vallejo, CA
ONE-ON-ONE *(Radio Shack)*
1,310-0 ★•Jon Breckel, Wilmington, OH
1,302-0 •Thomas Payton, Anderson, SC
1,280-0 •Randy Sunderland, Page, WV
1,276-0 •Jonathan Dorris, Indianapolis, IN
1,260-0 •Brandon Reece, Chickamauga, GA
OPERATION FREEDOM (THE RAINBOW, 8/85)
49,690 ★Craig Schneider, North Platte, NB
OUTHOUSE *(MichTron)*
534,060 ★Kay Foxe, Kansas City, MO
59,641 Sam Zehel, Coal Center, PA
38,640 Dave Staub, Moundsville, WV
PAPER ROUTE *(Diecom Products)*
248,400 ★Cathy E. Kimble, Glendale, AZ
150,560 Heather Hamblen, Bar Harbor, ME
PITFALL II *(Activision)*
1,568,500 ★Sandy Baker, Martin City, Montana
1,519,500 Jim Hammons, Martin City, Montana
1,085,500 Tracey Lee Slack, Atwood, Ontario
871,500 Aaron Florence, English, IN
586,500 Jonathan Toloski, Torrington, CT
POOYAN *(Datasoft)*
1,286,050 ★Craig Schneider, North Platte, NB
626,700 Charles Rene de Cotret, Saint-Laurent, Quebec
566,850 Lois Crowson, East Alton, IL
POPCORN *(Radio Shack)*
150,560 ★Tom Cherubino, Brooklyn, NY
105,560 Heather Condit, Grafton, ND
26,889 Claude Jalbert, Matane, Quebec
25,450 Dianne Mozzetti, Pittsburgh, PA
PROSPECTOR *(THE RAINBOW, 12/88)*
27,650 ★Ryun Schlecht, Gackle, ND
16,100 Sara Mittelstaedt, Kiel, WI
15,150 Cray Augsburg
5,000 Chris Nuwer, Lockport, NY
4,100 Angie Mittelstaedt, Kiel, WI
4,050 Jutta Kapfhammer
PYRAMID 2000 *(Radio Shack)*
220 ★Darren King, Yorkton, Saskatchewan
220 ★Mike Snyder, Allen, OK
PYRAMIX *(Color Venture)*
68,550 ★Andy Freeman, Turtle Lake, WI
67,850 Richard Winkelbauer, Bronx, NY
37,950 Blain Jamieson, Kingston, Ontario
QUIX *(Tom Mix)*
8,407,772 ★John Haldane, Tempe, AZ
RAD WARRIOR *(Epyx)*
4,112 ★Randy Stocksdale, Racine, WI
4,048 Jonathan Fullerton, Gardiner, ME
3,936 Matthew Smith, Courtenay, British Columbia
RADIO BALL *(Radio Shack)*
1,780,870 ★Jocelyn Gagne, St-David, Quebec
1,761,030 Eric Mellon, Newark, DE
1,666,670 Lise Gagne, St-David, Quebec
REACTOID *(Radio Shack)*
8,055 ★Gary Budzak, Westerville, OH
RED WARRIOR *(Radio Shack)*
5,488 ★Scott Godfrey, Nashua, NH
4,164 Roger Rance, Charleston, SC
4,011 Erin Carlton, Charleston, SC
RESCUE ON FRACTALUS *(Epyx)*
1,000,948 ★Steven Ujvary, Calgary, Alberta
323,167 Kenneth Hill, Severna Park, MD
RETURN OF JUNIOR'S REVENGE *(Colorware)*
1,792,800 ★Chad Presley, Luseland, Saskatchewan
ROGUE *(Epyx)*
71,833 ★Jon Fogarty, Yale, MI
65,529 Joseph H. Campbell, Norfolk, VA
SAILOR MAN *(Tom Mix)*
427,700 ★Marnie Schalm, Edson, Alberta
247,900 Jason Bauer, Menominee, MI
231,900 Jessica Wilkins, Seymour, TN
SANDS OF EGYPT *(Radio Shack)*
67 ★Tristan Terkuc, Richmond, Ontario
82 Edward Rocha, Cobleskill, NY
SAUCER DEFENSE *(THE RAINBOW, 4/87)*
95,000 ★Kevin Hilton, Conway, AZ
40,000 David Hartmann, Osoyoos, British Columbia
SCRATCH GOLFER (THE RAINBOW, 3/89)
63 ★Leif Smedberg, Churubusco, IN
SHAMUS *(Radio Shack)*
61,745 ★Scott Galvao, Tiverton, RI
50,840 Chris Kremo, Bethel, CT
SHOOTING GALLERY *(Radio Shack)*
36,830 ★Patricia Strakey, Littleton, CO
27,270 Jocelyn Hellyer, Montgomery, IL
25,510 Donald Knudson, Minot, ND
SHOOT'N RANGE (THE RAINBOW, 8/87)
55,623 ★Paul Robbins, Picayune, MS
14,702 Richard Winkelbauer, Bronx, NY
13,794 Phillip Holsten, Modesto, CA
SILPHEED *(Game Arts)*
80,603 ★Frankie DiGiovanni, Olney, MD
SLAY THE NERIUS *(Radio Shack)*
73,091 ★Jeff Remick, Warren, MI
65,921 Chris Lucero, Denver, CO
63,476 Chris Kremo, Bethel, CT
21,410 Scott Severtson, Jamestown, NY
SNEAKY SNAKE (THE RAINBOW, 8/87)
137 ★Guy Greene, Bradenton, FL
102 Mike Alt, San Juan Capistrano, CA
91 Chris Nuwer, Lockport, NY
SPACE ASSAULT *(Radio Shack)*
13,110 ★Jeff Remick, Warren, MI
7,280 Jason Kopp, Downs, IL
6,200 John Weaver, Amsterdam, NY
SPACE INVADERS *(Spectral Associates)*
3,920 ★Ari Enkin, Neapen, Ontario
SPEED RACER *(MichTron)*
103,120 ★Ricky Turkett, Marlow, OK
97,400 Jeff Morrison, Marlow, OK
96,420 Karen Rimiller, Adams, NY
96,000 Amber Reynolds, White City, Saskatchewan
SPEEDSTER (THE RAINBOW 8/87)
250,500 ★Kevin Hilton, Conway, AZ
211,300 Paul Robbins, Picayune, MS
117,080 Bill Millington, Meriden, CT
SPIDERCIDE *(Radio Shack)*
27,730 ★Mike LeBrun, Cornwall, Ontario
SPRINGSTER *(Radio Shack)*
303,520 ★Mavis Hartmann, Osoyoos, British Columbia
SPRINGSTER (continued)
200,670 Denise Root, Thorndale, PA
41,230 Jason Trammel, Murphysboro, IL
STAR BLAZE *(Radio Shack)*
8,950 ★Richard Durksen, Grunthal, Manitoba
6,550 Flint Weller, Swarthmore, PA
STOCK 3 (THE RAINBOW, 11/88)
77,386,525 ★Guy Greene, Bradenton, FL
STRATA (THE RAINBOW, 5/88)
4,380 ★Blain Jamieson, Kingston, Ontario
4,040 Ryun Schlecht, Gackle, ND
3,110 Kathy Rumpel, Arcadia, WI
2,992 Alan Lindaberry, Thorndale, PA
SUPER PITFALL *(Radio Shack)*
1,752,500 ★Bruce Hoffsommer, Ridley Park, PA
1,708,000 John Lipstraw, Rising Star, TX
1,700,000 Tom Jones, Milan, IL
TEMPLE OF ROM *(Radio Shack)*
604,000 ★Troy Graham, Arnold, MD
507,700 Adam Broughton, Morris, PA
303,600 Tim Hennon, Highland, IN
TETRIS *(Radio Shack)*
4,258 ★Chuck Lehotsky, N. Jackson, OH
THEXDER *(Sierra On-Line)*
2,033,000 ★Frankie DiGiovanni, Olney, MD
1,823,900 Tom Gauwitz, Roanoke, IL
1,411,700 Steve Hallin, Biloxi, MS
TIME BANDIT *(MichTron)*
76,030 ★Brent Morgan, Centerville, OH
59,020 Stephanie Morgan, Centerville, OH
TOADER (THE RAINBOW, 2/89)
5,117 ★Jon Hobson, Plainfield, WI
TREKBOER *(Mark Data)*
123 ★Roy Grant, Toledo, OH
132 Matthew Fumich, Munford, TN
TRIG ATTACK *(Sugar Software)*
196,000 ★Cassaundra Stewart, Sacramento, CA
TUT'S TOMB (THE RAINBOW, 7/88)
54,344 ★Brian Brame, Lakeside, CA
53,280 William Currie, Bryans Road, MD
VARLOC *(Radio Shack)*
2,502 ★Frank D'Amato, Brooklyn, NY
2,032 Tony Harbin, Cullman, AL
2,032 Edward Rocha, Cobleskill, NY
VICIOUS VIC (THE RAINBOW, 7/86)
18,813 ★Talib Khan, Bronx, NY
15,063 John Conley, Everett, WA
WARRIOR KING *(Sundog Systems)*
18,700 ★Jason Bauer, Menominee, MI
WILDWEST *(Tom Mix)*
52 ★Farrell Kenimer, Phoenix, AZ
35 ★Paul Summers, Orange Park, FL
WISHBRINGER *(Infocom)*
400/201 ★Brad Wilson, Lithia Springs, GA
WIZARD'S DEN *(Tom Mix)*
593,950 ★Richard Winkelbauer, Bronx, NY
425,350 Leif Smedberg, Columbia City, IN
195,050 Mark Touchette, Preston, CT
WRESTLE MANIAC *(Diecom)*
956,971 ★Marc Reiter, Cincinnati, OH
546,315 Louis Bouchard, Gatineau, Quebec
ZAKSUND *(Elite Software)*
557,900 ★Tom Cherubino, Brooklyn, NY
357,550 Martin Parada, Arcadia, CA
268,350 Tony Bacon, Mt. Vernon, IN
ZAXXON *(Datasoft)*
2,061,000 ★Byron Alford, Raytown, MO
1,950,000 Blake Cadmus, Reading, PA
ZONERUNNER *(Radio Shack)*
65,535 ★Scott Godfrey, Nashua, NH
65,535 ★Mike Woycheshen, Coquitlam, British Columbia
ZORK I(Infocom)
350/328 ★Konnie Grant, Toledo, OH
350/587 Matthew Yarrows, Easthampton, MA

— Vivian Turbeville

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this bi-monthly column of pointers for our game-playing readers' benefit. If you have some interesting hints, tips or responses to questions, or want help yourself, we encourage you to write to the Scoreboard, c/o THE RAINBOW.

In response to questions from:

- Chad Presley: In *Wild West*, if you give Jenny the fake map, she will send Black Bart to the canyon. Lasso the tree, climb the rope and then it is a good idea to use the dynamite. I have no idea what to do next.

Farrell Kenimer
Phoenix, Arizona

- Alan Lindaberry: In *Dungeons of Daggorath*, you do not need a ring to kill the stone giant. You need the wooden sword and leather shield. You must kill the snake in order to get the shield. Attack with the shield, press M and run away. Then, go after him again until your heartbeat climbs up, or until he dies. After killing the giant, press E and see if he left you a ring. You will not get the steel ring right away. First you will get the Vulcon ring, then iron and so on.

In *Dungeons of Daggorath*, to get the wizard, am I supposed to go up in the dungeon, or go down in the holes of the dungeon?

Chuck Carpinello
Rensselear, New York

- Frankie DiGiovanni: In *Dungeons of Daggorath*, to incant the Supreme ring, you must first read the beginning of the book, where you will find another name for the ring. Next look up the meaning of the word in the dictionary; you will find the right word, but in the wrong form. The word is a synonym for *supreme*. After finding the correct word, you will finish the game.

Is there any way to get the scroll left by the wizard's image? Also, what does the flask do?

Derek Wood
Sydney, Nova Scotia

- Alan Lindaberry: In *Bedlam*, to get past the dog you will need the blue pill and the meat. Put the blue pill in the meat and feed it to the dog. He will die and you will be able to pass. To get the green key, stand outside the shock room and get it with the window hook. Before you leave the kennel, be sure you have the green key, as it is necessary to escape.

Jon Hobson
Plainfield, Wisconsin

- Frankie DiGiovanni: In *Gantelet II*, to get out of the first room of the nineteenth level, open the door in the bottom-right corner of the room.

Jonathan Wanagel
Freeville, New York

Here are some hints for *The Interbank Incident*: The first things you need are the tracker and the rod. When you have these, go to each of the four cities and use the tracker with the rod fitted into the tracker. This will tell you where the hideout is located. You will also need six of the eight clues that the people will give you *before* you can enter the hideout.

Here are a few more tips: Read the newspaper to the guard and give him the matchbook at the air force base in Germany; buy the lady on the beach a drink; give the dice to the guy in the casino in Rio; and be sure to have either the rope or the Code book to solve the adventure.

David Ring
Lyman, Nebraska

In *The Interbank Incident*, what do you do with the dice, hi-level gold card, newspaper, hundred dollar bill, ring and postcard? There are lots of doors I can unlock (apartments, souvenior shop, Eifel Tower, etc.), but I can't enter. I go back and forth and never get anywhere.

Rommel Bruehl
Baton Rouge, Louisiana

In *Shenanigans*, how do I convince the computer to open the trap door in the cavern so I can go up, get my pole and win the game?

David McCoy
Franklin, North Carolina

In *In Quest for the Starlord*, do you do anything at the lake? How do you get past the machinery?

In *Horror House*, where do you find the key to get out of the house?

Matthew Smith
Bourtenay, British Columbia

In *Caladuril Flame of Light*, where do you get the birdseed to feed the parrot? How do you get through the four locked doors. What do you do with the conveyor belt?

Anne Benson
Uniontown, Ohio

In *A Mazing World of Malcom Mortar*, when I'm through all three mazes, how can I collect the three magic bricks and still trap Malcom Mortar to get into Level Two?

William C. Millington
Meriden, Connecticut

In *Dragon Blade*, I have come to a huge stone door after locating the whirlpool, but I can't open it.

In *Dallas Quest*, how do you kill the spider?

Scott Brady
Lake Worth, Florida

In *Sea Quest*, I have the air tanks but I can't use the air compressor. What else do I need to do?

In *The Black Sanctum*, every time I type `GO MIRROR` or `ENTER MIRROR` the screen locks up. What should I do from here?

Greg Dorsha
Williston, North Dakota

To respond to other readers' inquiries and requests for assistance, reply to "Scoreboard Pointers," c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will share your reply with all "Scoreboard" readers in an upcoming issue.

For greater convenience, "Scoreboard Pointers" and requests for assistance may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`. Be sure to include your complete name and address.

Color Computer Software from Cer-Comp Ltd.

Window Master V2.2

The hottest new program available for the Color Computer III! Now you can have Windows, Icons, Buttons, Pull-Down Menus, Edit Fields and Mouse Functions built into your Basic or Machine Language Programs easily and quickly, without the need for OS9.

It supports up to 31 Windows on the display, multiple fonts in 54 possible sizes and styles, Enhanced Basic Editing and much more. It adds over 50 Commands and Functions to Basic to fully support the Point & Click Window System. In fact it has so many features it would take several pages to to describe them all.

It is completely compatible with existing Basic programs and takes absolutely no memory away from Basic. It contains a built in Ram Disk which is completely transparent to Basic (512k version) for enhanced operation.

It requires 1 Disk Drive, R.S. Hi-Res Interface & Joystick or Mouse. Includes both the 128k & 512k versions for only $69.95

Window-Ware

Window Writer - A Point & Click Word Processor, features both Mouse & Keyboard type editing, proportional printer support, powerful formatting capability, works with any printer. Requires Window Master & 512k- $59.95

Window Basic Compiler - A Basic Compiler similar to CBASIC only it compiles all the Window Basic statements to create super fast M.L. programs & Desk Accessory programs for Window Master $99.00

Window EDT/ASM - A full featured Editor/Assembler and Debugger for the Window Master System $49.95

Font/Icon Editors - A utility disk with the Font & Icon Editors so you can edit or create your own, includes Basic & M.L. versions $19.95

Advanced Programmers Guide - A manual for the Advanced Basic & M.L. Programmer with information on interfacing to Window Masters complete system including System Calls, Memory Map, Interrupt handling & Extended Memory access. $24.95

512K RAM UPGRADE

Give your COCO 3 all the power it deserves with this easy to install (no soldering/plug in) 100% Tandy compatible 512K memory upgrade. Completely assembled and tested. Includes Ramdisk & Memory Test software described below. $159.95, Upgrade + Window Master $199

512K RAMDISK & TESTER

RAMDISK is an ALL Machine Language program that will give you 2 ULTRA High Speed Ram Disks in you CoCo-3. It does not need or require the OS-9 operating system. It works with R.S. DOS V1.0 or V1.1 and it is completely compatible with Enhanced Color Disk Basic! Plus it allows your CoCo-3 to run at double speed all the time even for floppy disk access!!! It will not disappear when you press reset like some other ramdisk programs. The MEMORY tester is a fast ML program to test the 512K ram. It performs several bit tests as well as an address test so you know that your 512K of memory is working perfectly.

Requires 512K & Disk $19.95

CBASIC Editor/Compiler

The ULTIMATE Color Computer BASIC COMPILER!!!

If you want to write fast efficient machine language programs and you don't want to spend the next few years trying to learn how to write them in Assembly language or with a cheap compiler, then CBASIC is the answer!!!

CBASIC is the only fully integrated Basic Compiler and Program Editing System available for the Color Computer. It will allow you to take full advantage of all the capabilities available in your CoCo without having to spend years trying to learn assembly language programming. CBASIC allows you to create, edit and convert programs from a language you are already familiar with Enhanced Disk Color Basic, into fast efficient machine language programs easily and quickly.

CBASIC supports all the enhanced hardware available in the CoCo 2 & 3, including Hi-Res Graphics, & Screen displays, Extended Memory and Interrupts. We even added advanced commands not available in Basic to give you a level of control only available to very advanced Machine Language Programmers. Plus we made it exceptionally easy to use, not like some other compilers. CBASIC is the friendliest and easiest compiler available for the Color Computer.

CBASIC is a powerful tool for the Beginner as well as the Advanced Basic or Machine Language programmer. CBASIC features well over 150 Compiled Basic Commands and Functions that fully support Disk Sequential and Direct access files, Tape, Printer and Screen I/O. It supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Enhanced Color Basic, including Graphics H/GET, H/Put, H/Play and H/DRAW, all with 99.9% syntax compatibility.

CBASIC makes full use of the powerful and flexible GIMI chip in the Color Computer 3. It will fully utilize the 128K of RAM available and install 2 Ultra Fast Ramdisks if 512K is available, for program Creation, Editing and Compilation. You can easily access all 512K of memory in a Compiled program thru several extended memory commands that can access it in 32K or 8K blocks and single or double bytes.

CBASIC has its own completely integrated Basic Program Editor which allows you to load, edit or create programs for the compiler. It is a full featured editor designed specifically for writing Basic programs. It has block move and copy, program renumbering, automatic line number generation, screen editing, printer control and much more.

Coco 1,2 or 3 Disk $149.00

To order products by mail, send check or money order for the amount of purchase, plus $3.00 for shipping & handling to the address below.
To order by VISA, MASTERCARD or COD call us at (702) 452-0632
(Monday thru Saturday, 8am to 5pm PST).

CER-COMP Ltd.
5566 Ricochet Avenue
Las Vegas, Nevada 89110
702-452-0632

DataPack III Plus V1.1

SUPER SMART TERMINAL PROGRAM
AUTOPILOTand AUTO-LOG Command Processors
X-MODEM DIRECT DISK FILE TRANSFER
VT-100 & VT-52 TERMINAL EMULATION

- No lost data even at 2400 Baud on the Serial port.
- 8 Selectable Display Formats, 32/40/64/80 columns
- ASCII & BINARY disk file transfer via XMODEM.
- Directly record receive data (Data Logging).
- VT-100 emulation for VAX, UNIX and other systems.
- VT-100/52 cursor keys ,position,, PF & Alt. Kbd. keys.
- Programmable Word Length, Parity, Stop Bits .
- Complete Full and Half Duplex operation,
- Send full 128 character set from Keyboard
- Complete Editor, Insert, Delete, Change or Add.
- 9 Variable length, Programmable Macro Key buffers.
- Programmable Printer rates from 110 to 9600 Baud.
- Send Files from the Buffer, Macro Keys or Disk.
- Display or Print the contents of the 50k Buffer.
- Freeze Display & Review information On line.
- Built in Command Menu (Help) Display.
- Built in 2 Drive RAMDISK for 512K RAM.

Supports: R. S. Modem-Pak & Deluxe RS-232 Pak.

Coco 1, 2 or 3 Disk - $59.95

"The SOURCE"

DISASSEMBLER & SOURCE CODE GENERATOR

The SOURCE will allow you to easily & quickly Disassemble Color Computer machine language programs Directly from Disk and generate beautiful, Assembler Source code.

- Automatic label generation.
- Allows specifying FCB, FDB and FCC areas.
- Disassemble programs Directly from disk.
- Automatically locates address.
- Output listings to the Printer, Screen or both.
- Generates Assembler source directly to disk.
- Built in Hex/Ascii dump/display.
- 8 Selectable Display formats 32/40/64/80 .
- Selectable Foreground & Background colors.
- Built in Disk Directory an Kill file commands.
- Menu display with single key commands.
- Written in Ultra Fast Machine Language.

Coco 1, 2 or 3 Disk $49.95

EDT/ASM III

DISK EDITOR ASSEMBLER

EDT/ASM III is a Disk based co-resident Text Editor & Assembler. It is designed to take advantage of the new features available in the CoCo-3 with either 128K or 512K of memory. It has 8 display formats from 32/40/64/80 columns. There is also a free standing ML Debug Monitor.

EDT/ASM III has the most powerful, easy to use Text Editor available in any Editor/Assembler package for the Color Computer.

- Local and Global string search and/or replace.
- Full Screen line editing .
- Easy to use Single key editing commands.
- Load & Save standard ASCII formatted files.
- Block Move & Copy, Insert, Delete, Overtype.
- Create and Edit files larger than memory.

The Assembler features include:

- Supports Conditional IF/THEN/ELSE assembly.
- Supports Disk Library file up to 9 levels deep.
- Supports standard Motorola directives.
- Allows multiple values in FCB & FDB directives
- Allows assembly from the Buffer, Disk or both.

Coco 1, 2 or 3 Disk $59.95

Stepping into the world of 40- and 80-track drives

The DEFs of Disk Drives

By Tony DiStefano
Rainbow Contributing Editor

In last month's column, I covered the ABCs of how a disk drive works — its mechanical parts and how it accesses the data available on the disk. I'll continue on that track, giving more detail to the differences between 40- and 80-track drives. Part of the article will concentrate on designing a small circuit that allows CoCo users to read standard CoCo disks with an 80-track drive.

The need for 80-track drives came about with the need to store more data on one disk. If a 40-track double-sided drive can hold 360K of data, then an 80-track double-sided drive should hold 720K of data. In fact, it does. But instead of going back to the 8-inch drive, which has more data storage, the manufacturer decided to double the amount of data by doubling the amount of tracks on the same-size disk. The only problem with this is that it becomes incompatible with the 40-track drives. The differences make it impossible for an 80-track drive to read a 40-track disk.

One difference between the two is obviously the number of tracks. But how is that possible, when both are 5¼-inch drives? Well, the difference is in track size. On a 40-track drive the track density is 48 TPI (Tracks Per Inch). At 48 TPI, it takes just under one inch to make 40 tracks. If you look at a disk, one inch is about enough room to fit 40 tracks. If 40 tracks take up one inch, then 80 tracks take up two inches; that's too much to fit on a 5¼-inch disk. So the disk drive manufacturers decided to make the tracks thinner and closer together. To make them fit on the same size disk, the track density was doubled to 96 TPI. That allows 80 tracks to fit on the same size disk.

This, however, causes a few problems for both the drive and disk manufacturers. So the read and write head had to be made thinner and the stepping mechanism more accurate. This adds to the cost of the drive. In addition, the disk has to hold twice the data and be of better quality. Since the track size is smaller (thinner), the magnetic surface is smaller. In order to get the same reliability, the quality must be better — both with the heads and disks. When using 80-track drives, it is recommended that you use 96 TPI-rated disks. If you don't, you may not have any problems while the disks are new, but in the long run valuable data is safer with this type of disk.

Now, lets step back a little. The mechanism that steps the head back and forth is usually a motor called a stepper that can precisely rotate within certain speed limits. When Radio Shack first started selling drives, it took 30ms. (milliseconds) to make each step, but as motors improved, drives had shorter stepping times. Today an average 40-track drive has a stepping time of 6ms. When the 80-track drives came out, the manufacturer wanted it to be just as fast, so they increased the stepping time again to 3ms.

Look at Figure 1. It shows a few tracks on a typical disk. On the left side of the drawing are tracks made by a 40-track drive at 48 TPI. The track on the outer edge is Track 0; the next is Track 1, then Track 2 and so on. Tracks made by an 80-track drive are twice as thin as those of a 40-track drive. Notice, though, that Track 0, is on the outer edge on both sides.

Take a disk formatted in a 40-track drive and place it in an 80-track drive. If you step the 80-track drive to Track 0, you can read it; trouble starts when you want to read the next track and so on. Look again at the right-hand side of Figure 1. Imagine that you step the 80-track side one track inward to Track 1. Now move over to the right-hand side and see where you are. On the 40-track side, you are still on Track 0, yet the software expects Track 1. Now step in again. The software expects Track 2 but gets Track 1. For every track stepped, the result is half of what you expect. If you step up to Track 10, then you only get Track 5.

Stepping in or out, the ratio is always 2 to 1. Knowing this, I thought I could make a circuit that would generate two pulses for every one that came in. It would then be

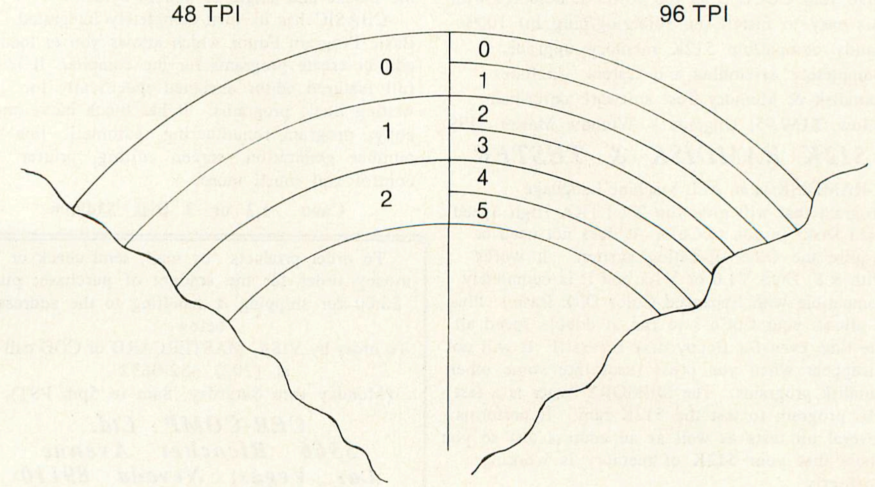


Figure 1

Tony DiStefano is a well-known early specialist in computer hardware projects. He lives in Laval Ouest, Quebec. Tony's username on Delphi is DISTO.

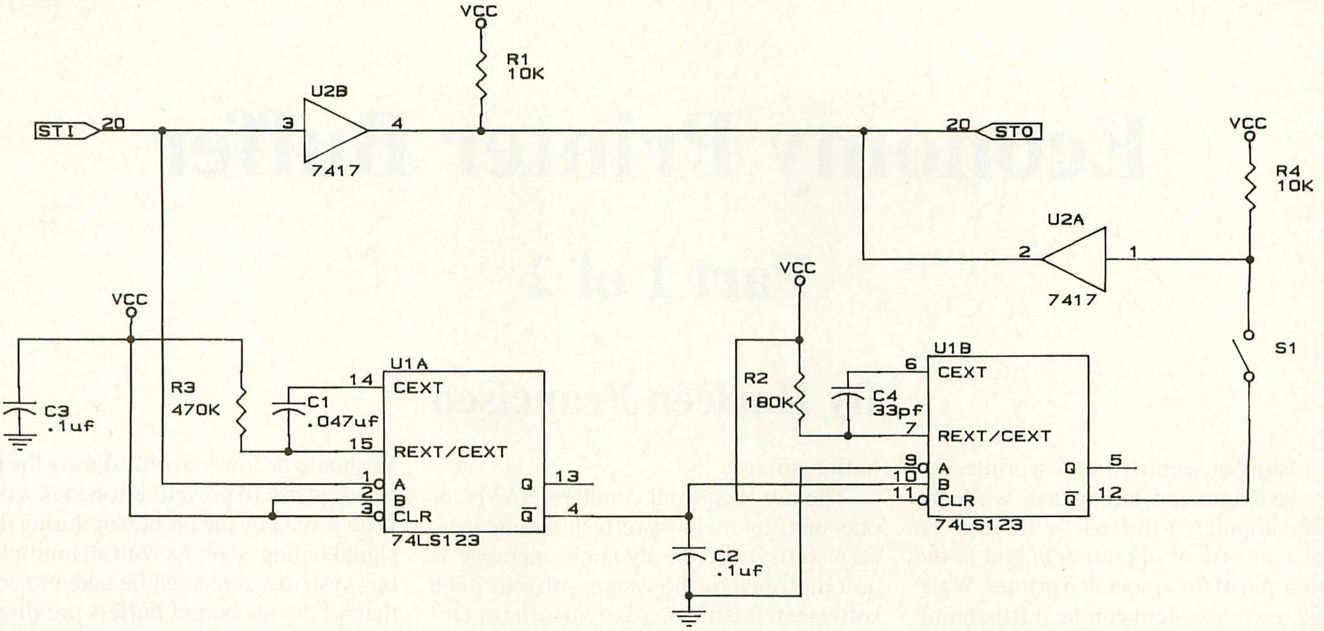


Figure 2

possible for an 80-track drive to read a standard 40-track disk. After a few experiments I came up with a doubling circuit. For every step pulse coming into the drive, two pulses come out.

When stepping a standard 40-track drive, the CoCo's controller waits a minimum of 6ms between steps. For an 80-track drive with a 3ms step rate, this is relatively slow. In fact, it can step twice as fast, so the circuit has time to step between steps.

Examine the circuit in Figure 2 used to make the double stepper. It consists of two TTL chips and a handful of passive components.

First it takes one pulse that comes in and changes it into two pulses. U2B acts as a buffer so that the second pulse doesn't trigger the circuit into oscillation. U1 is a dual *monostable multibrator*. The first part (U1A) is used as a delay. The pulses that come in on STI are very short and are coming in at every 6ms. I say short because they are short compared to the circuit's delay of 3ms between pulses. That is half the time between incoming pulses. (Remember that an 80-track drive can step every 3ms.) When a pulse enters into the A input of U1A, Q* (Pin 4) goes low and stays low for 3ms. Nothing happens until Q* goes high again. The B input of U1B circuit starts on the rising edge of Q*. When this pin gets a rising edge, it starts timing a much shorter pulse, about 4µs, the same pulse length as the incoming step pulse.

Now let's look at what happens to the STO point in the circuit. The first (original) pulse happens; STO sees one pulse; that triggers a pulse at U1A; about three milli-seconds later, a pulse triggers U1B. If the switch S1 is closed, the short pulse generated by U1B (4µs) goes through U2A and appears at STO. At that point the drive gets a second pulse to step. If S1 is opened, the pulse goes nowhere.

Construction for this project is not difficult. Besides parts, it requires opening your drive case and modifying the drive, which takes some electronic skills and should be done only by someone with experience in soldering and circuit modifying.

Concerning parts, look at the circuit in Figure 2. These are all the parts you need — four resistors, four capacitors, two chips and one switch. You'll need a small protoboard on which to mount all the parts. These are available at any Radio Shack store, unlike some of the other parts.

Connect all the pins to the chips; unmentioned pin numbers should be left unconnected. Pin 16 of U1 and Pin 14 of U2 should be connected to +5 volts. Pin 8 of U1 and Pin 7 of U2 should be connected to the ground. After all the components are mounted on the small board, it's time to mount the whole thing into your drive. I can only give you guidelines since the great variety of 80-track drives makes it difficult to be exact.

First you need to find a place to fit the board — once fitted, you have to connect 5 volts and ground. A voltmeter here is handy but not necessary. Locate the power connector to the drive. There are 5 volts, 12 volts and ground at the connector. Pin 4 is 5 volts and pins 2 and 3 are ground. The next step is to find the 34-pin edge connector. Locate Finger 20 and a convenient location, then cut the trace that leads to it. Solder the connection labeled STI to the side of the cut that leads to the finger, and solder another connection labeled STO to the other side of the cut. Mount the switch somewhere on or near the front of the drive, then reassemble the drive assembly and turn everything on.

Now insert a 40-track disk in the 80-track drive, turn the switch on, and type `DIR`. If it's not working, check your work; if you have a digital probe, use it.

Now that you have the circuit working, you need to know how to use it. While in OS-9, leave the switch off. This allows you to access all 80 tracks. (You must use the 80-track descriptor.) When you want to read standard 40-track disks, turn the switch on, use a 40-track descriptor and read the disk. Do not try to write on a 40-track disk with an 80-track drive. It will not work properly.

Economy Printer Buffer

Part 1 of 2

By Harleen Francisco

Listing or sending data to a printer can be a time-consuming task, while the computer is forced to slow down because its rate of operation is tied to the through-put of the associated printer. Waiting for such a system can be a frustrating experience. The Economy Printer Buffer solves this problem. It appears as a high-speed printer to the host computer, taking data as fast as it is supplied and passing that data to the associated printer as it is required. Your computer will not waste its valuable time printing but will be available for its primary purpose — computing!

Features

As shown in the schematic (See Figure 1.), the heart of the Economy Printer Buffer is a 6803 eight-bit microprocessor. The 6803 has built-in peripheral functions: A serial interface, a 16-bit timer and Input/Output lines. These functions allow us to build a very compact system.

Storage capacity is 64K bytes of memory (eight 4164-type dynamic RAMs). Two types of interfaces are selectable: parallel to parallel, or serial to parallel. The serial to parallel interface may be set up in one of two different ways: internal (9600 baud using the internal 6803 clock) or external (150, 300, 600, 1200, 2400, 4800 or 9600 baud). These external baud rates are produced by dividing the E clock and feeding that clock back into the 6803 at Pin 10 (P22).

Two LEDs are provided to indicate status: one for Full/Busy and one for Error/Dupe. Two switch-functions are provided for control input to the buffer: one for reset, the other for obtaining a duplicate output of the buffer storage.

The use of special counters, SAMs, or one-shots for memory refresh are unnecessary; refresh of the dynamic memory is accomplished by the system software. The software refresh is transparent to the operation of the buffer.

Interfaces

Parallel (centronics type) interfaces are accomplished by a Peripheral Interface Adapter (PIA). The cables used for these interfaces may be up to six feet.

The serial interface uses the full-duplex Serial Communications Interface (SCI) within the 6803 microprocessor. This interface operates using a standard form. Each character-set consists of one start-bit, eight data-bits and one stop-bit. The 9600 baud rate uses the internal timer of the 6803 for its clock source. If any other baud rates are desired, an external baud clock must be used. This arrangement is illustrated in Figure 2.

The correct baud rate frequencies require that a 4.9152 MHz crystal be used. This results in a clock rate of 1.2288 MHz at the microprocessor. A clock rate greater than 1.0 MHz requires 6803-1; however, I have used normal 6803's with no problems. If you already have a 6803, try it.

Hardware

All members of the 6803 family have a multiplexed address/data bus when in their expanded mode. Address lines A0 to 7 are multiplexed with the data lines D0 to 7 on Port 3. An address-strobe pulse occurs during the low phase of Enable-Sign E. The address is guaranteed to be valid on Port 3 only during the falling edge of AS, at which time it is frozen by an LS373 latch IC. Address lines A8 to 15, produced by Port 4, are not multiplexed and are valid throughout most of the Enable cycle.

During the E-clock high phase, Port 3 either presents data for writing, or expects to see data for reading. Read/Write line R/W should be lowered only during the positive E phase to prevent erroneous writing. Data is read by the processor during the E-signal falling edge. As with all multiplexed bus systems, care must be taken to ensure that all device output buffers are disabled during the E-signal low phase; otherwise bus contention will result. After having obtained essentially separate address and data buses, connection of the 2716 EPROM and 6821 PIA is easy.

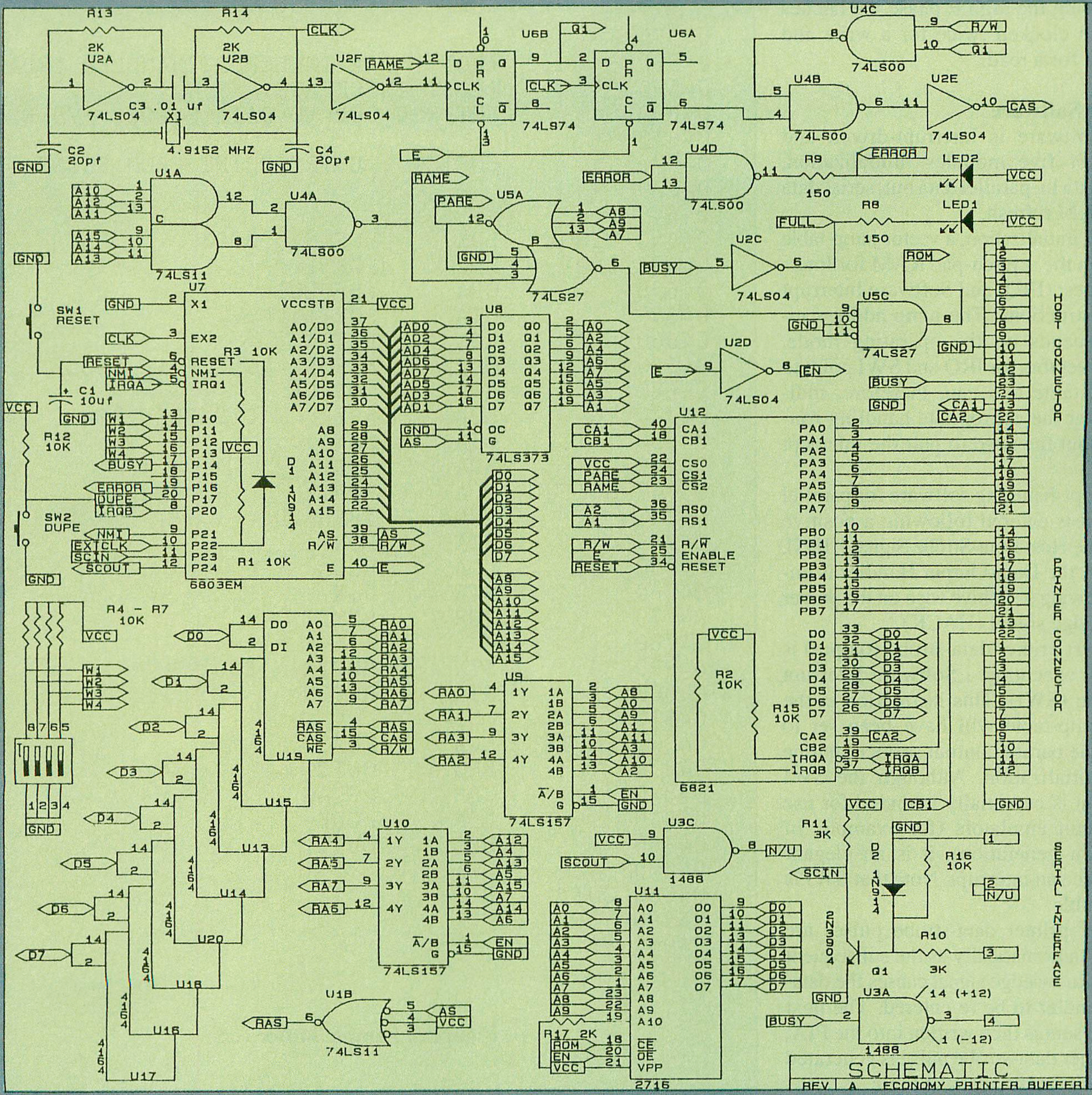
Memory decoding is arranged to keep as much of the 64K byte address space as possible free for buffer RAM, while using a minimum of ICs. As the software is less than 1K byte long, only half of the 2716 is used, but Address-Line A10 is tied high through a 2K resistor.

Most systems using dynamic RAMs have RAM controllers to generate timing signals and to refresh the memory independently. These controllers tend to be costly, but, as their performance is not essential in this application, I chose to use a software technique (described later). As a bonus, the hardware required to implement this is minimal.

To reduce the number of pins used on the 64K byte dynamic RAMs, address lines A0 to 7 are multiplexed with lines A8 to 15 using two signals, called Row-Address Strobe (RAS) and Column-Address Strobe (CAS). The address bus is multiplexed with the E-signal using two LS157 quad two-to-one line multiplexers. The timing allows it to be used directly as RAS during the E-signal low phase.

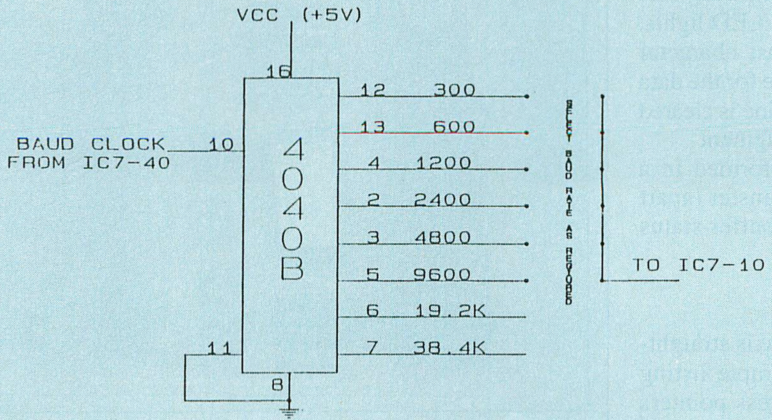
Generating CAS is a little more difficult. When the RAM is accessed, the RAM E-signal is clocked through two D-type latches by the microprocessor input clock. The E-signal is derived from the processor clock and is one quarter of its frequency. The D-type devices are, however, held clear during the E-signal low phase (while CAS is held high). In order to meet data set-up times for the processor and RAMs, CAS is also conditioned by the R/W signal.

Harleen Francisco is a pediatric nurse who enjoys working with children. Her hobbies include music, horseback riding and computers. Harleen, together with her husband, Gene, design and develop computer peripherals.



SCHEMATIC
REV A ECONOMY PRINTER BUFFER
6803EM
74LS04
74LS74
74LS00
74LS11
74LS27
74LS373
74LS157
74LS157
6821
1488
1488
2716
4.9152 MHZ
SW1 RESET
SW2 DUPE
LED1
LED2
2N3904
HOST CONNECTOR
PRINTER CONNECTOR
SERIAL INTERFACE

Figure 1: Schematic



VCC (+5V)
BAUD CLOCK FROM IC7-40
4040B
16
10
11
8
12 300
13 600
4 1200
2 2400
3 4800
5 9600
6 19.2K
7 38.4K
SELECT BAUD RATE AS REQUIRED
TO IC7-10

Figure 2: External baud clock

Hence, CAS will fall only if RAM E is true, and if during the high E phase the latches have been clocked twice for a write and only once for a read.

Modular Software

The software is interrupt-driven and consists of five modules: initialization, parallel data in, parallel data out, serial data in and RAM refresh.

During initialization, a vector jump-table is set up in the scratch-pad RAM for Interrupt Request (IRQ) and Software Interrupt (SWI) instructions. The jump address inserted depends on the operating mode. Interrupt vectors for IRQ and SWI point to the jump-table and can, therefore, indirectly enter the appropriate handling routine without the need to poll the interrupt sources.

Interrupt-handling software for parallel data-input is entered following a positive edge on the Host Data-Strobe Signal (HDS). Similarly, the Data-Output Handler is entered following a positive edge on the printer acknowledge signal (HACK).

The first printer data-strobe (output) is forced by executing a Software Interrupt instruction (SWI). This instruction in the vector jump-table will have been set to point to the parallel output service routine during initialization. Although the SWI instruction is essentially intended for use by in-circuit emulators (for example, in break-point generation), it is an elegant way to force an interrupt. Note that SWI is *not maskable.*

Further printer data-strobe pulses are generated automatically as the subsequent printer-acknowledge signal causes the data-output handler to be re-entered. The next byte to be sent is then written into the PIA, and a further data-strobe pulse is generated by the on-board handshake logic.

Similarly, acknowledge pulses to the host are also generated automatically whenever the input PIA port is read.

If the buffer becomes full, the Busy line is asserted and the buffer-full LED lights. Acknowledgement for the last character strobed is not sent before space for the data becomes available. The Busy line is cleared before sending the acknowledgment.

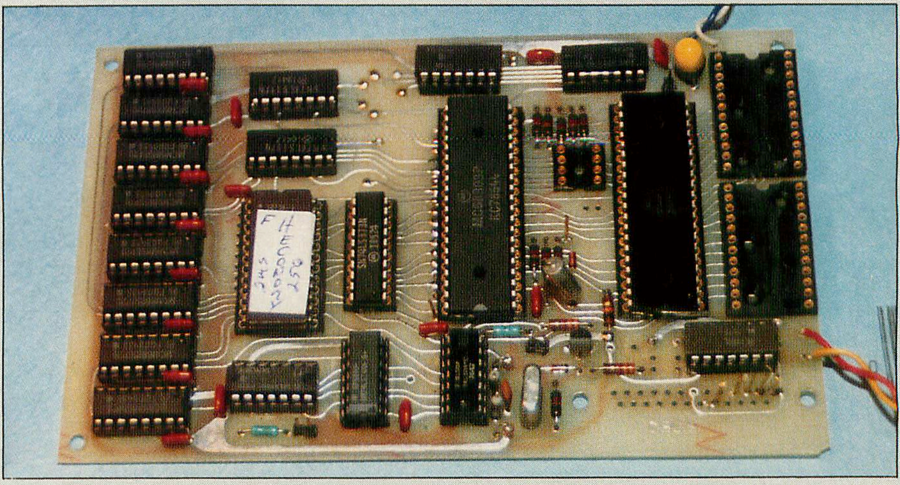
Serial data transfer is performed in a way similar to parallel data transfer (apart from the handshaking and buffer-status differences).

Simple Code

Much of the buffer software is straightforward, as seen from the sample listing (See Figure 3). The two address pointers are `BUFIN` and `BUFOUT`. After checking that the buffer is not already full, the program reads the PIA, which causes an acknowl-

```
04570 **
04580 **        IRQ1 : PIA INTERRUPT HANDLER IRQA
04590 **        (HOST INTERFACE)
04600 **        ENTERED DUE TO DATA STROBE +VE EDGE
04610 **
04620 **        EMPTST : ENTRY POINT FROM SCIIN
04630 **
04640
04650 *IRQ1     LDX     BUFIN    6803
04657 IRQ1      LDA     PORT1
04658           ORA     #BFULL1
04659           STA     PORT1
04660           LDU     BUFIN
04670           CMPX    BUFOUT   CHECK IF FULL
04680           BNE     NOTFUL
04720           LDA     #$2E     DISABLE IRQA
04730           STA     CONA
04740           BRA     QUIT
04747 NOTFUL    LDA     PORT1
04748           ANDA    #BFULL0
04749           STA     PORT1
04750           LDA     REGA
04760           STA     0,X
04770           JSR     LIMIT
04780
04790 *         STX     BUFIN    6803
04800           STU     BUFIN
04810
04820 EMPTST    LDA     FLAG
04830           BEQ     QUIT
04840           CLR     >FLAG
04850           LDA     MODE
04860           BEQ     QUIT
04870           SWI
04880 QUIT      RTI
04890
04900 **
```

Figure 3: Sample buffer code



This photo shows the completed project (circuit board with parts) without the case.

The CoCo Graphics Designer Plus

BANNERS, SIGNS & GREETING CARDS

In Jim Issel's complete review in the May 89 issue of Rainbow (page 110), he said

> *"...a top notch program. The graphics are superb; the documentation excellent; the user interface simple, easy to use and efficient; and the price makes it a steal ... this really is one program that everyone can use."*

The CoCo Graphics Designer Plus (CGDP), lets you combine borders, text, and pictures from it's built in collections (and from our supplementary disks) to make great looking banners, signs, and greeting cards. It is very easy to use, and has been favorably compared to Broederbund's ever popular "Print Shop" program on Apple and IBM computers.

It runs on a CoCo 2 64K or CoCo 3 with a disk, mouse or joystick, and compatible printer. Most popular dot-matrix printers are supported.

Print Shop, Apple, and IBM are trademarks of their respective companies.

CoCo Graphics Designer Plus........... $29.95

Supplementary CGDP Disks $14.95 each: **Border Disk #1** contains 176 borders . **Font Disk A** and **Font Disk B** contain 10 fonts each. Picture disks #2,#3, and #4 contain 120 picture each. *See our full page ad in the May 89 Rainbow on page 145.*

FastDupe II

The FASTEST disk copier ever! Fastdupe II will FORMAT and BACKUP a disk in only one pass (up to 23 grans) and can make up to 4 disk copies at once in 2 minutes! The "must have" utility for every multiple disk drive owner. CoCo I, II, & III 64K $14.95

Disk Utility 2.1A

A multi-featured tool for USER FRIENDLY disk handling. Utilize a directory window to selectively sort, move rename & kill file entries. Lightning fast Disk I/O for format, copy & backup. SIngle key execution of both BASIC & Machine Language programs. CoCo I,II, & III 64K $9.95

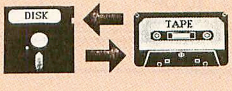
CoCo Checker

Could something possibly be wrong with your CoCo? How can you tell? CoCo Checker is the answer! CoCo Checker will test your ROMs, RAMs, disk drives & controller, printer, keyboard, cassette, joysticks, sound, PIAs, VDG, internal clock speed, Multi-Pak Interface & more! CoCo I, II 64K Disk $19.95

Mulit-Pak Crack

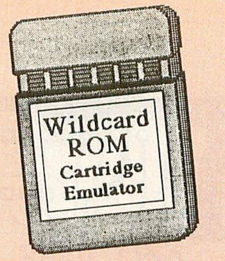
Save ROMPAKs to your 64K disk system using the RS Multi-Pak interface. Eliminate constant plugging in of ROMPAKs by deeping your PAK software on disk. Includes POKES for "PROBLEM" ROMPAKs including: Cyrus, Dragon Fire, Demon Attack, Downland, & Stellar Lifeline. (Will NOT crack CoCo 3 32k PAKs.) CoCo I,II,II 64K $16.95

Tape to Disk Utility



A powerful software package that quickly and easily transfers programs from tape to disk and disk to tape automatically. Ideal for copying Rainbow on Tape to disk! Also copies tape to tape, & prints tape & disk directories. CoCo I,II & III $14.95

WILDCARD -

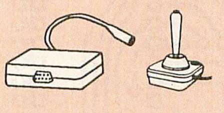


New ROM Cartridge Emulator for Multi-Pak Owners and Game Designers.

This piece of hardware and software magic reads the contents of any CoCo ROM cartridge up to 32K onto a disk. The cartridge program can then be run on the ROM cartridge emulator independently of the original cartridge. Great for game aficionados and developers. Requires CoCo 2 or 3, 64K Mulit-Pak, & disk drive.

WILDCARD ROM Cartridge Emulator............$119.95

Atari-to-CoCo Joystick Adaptors



With this adaptor you can connect any Atari type joystick to your CoCo.

Atari joysticks respond faster, center better, and are more rugged than CoCo Joysticks. They will improve the play of many CoCo games. The adaptor also features a built-in 6-ft. extender cable.

Order JSA1 Joystick Adaptor $12.95

Kraft Atari ACE Compatible Joystick $6.95

Sundog's Warrior King, one of the hottest current action games, and superb with our adaptor $29.95

Include $3 S&H, UPS COD add $3. Checks, MO's & VISA/MC accepted.

Zebra Systems, Inc.
78-06 Jamaica Ave.
Woodhaven, NY 11421
(718) 296-2385

Telepatch II

If you own TeleWriter-64 there's no need to buy an expensive new word processor to get the latest features!. Enhance Telewriter-64 with a type-ahead buffer, overstrike mode, repeating keys, key beep, faster cursor movement, faster disk I/O, print spooler, TRUE block moves and much more! Includes WIZARD proportional on-screen characters with TRUE lowercase! Requires Telewriter-64, CoCo I,II,III $16.95

Car Sign Designer

CAR
SIGN
DESIGNER™

Design eye catching 5 inch diamond shaped signs. Very easy to use and gives great printouts. Includes 2 plastic sign holders and suction cups. CoCo II or 3 64K

CoCo CSD without yellow paper.............................$9.95

CoCo CSD plus 50 sheets of special very bright yellow paper $14.95

Schematic Drafting Processor

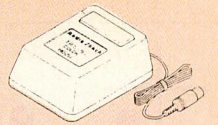
Supports most popular dot-matrix printers. Save time and design pro looking diagrams using a 480 X 540 pixel worksheet w/6 viewing windows. Over 30 common electronic symbols W/10 user-definable symbols (Even logic gates & multipin chips!) You can save your diagrams to disk for later retrieval. Prints to most popular Dot-Matrix printers! CoCO I,II,II $18.95

Printer Font Generator

Write files using any CoCo word processor (TW-64, Elite*word, etc.) and print them using highly detailed character sets such as: Italics, Old English, Furuistic and Block! A character-set editor is included! Supports most popular dt-matrix printers (Epson, Gemini, Star, Tandy, Okidata). CoCo I,II, III 64K $16.95

Comming soon! Look for Zebra's new "Label Designer" program incorporating a full Graphics User Interface. Make great labels with text and pictures.

CoCo Mouse $19.95



Radio Shack TRS-80 Color Mouse Cat. No. 26-3025 (one button). *Limited to the 120 pieces in stock. Phone orders only please. At this price they'll last a week.*

HDS Floppy Disk Controllers

We have 80 new floppy disk controllers. These were made for us by Hard Drive Specialists. They feature Gold plated edge connectors, and Radio Shack ROMs. While they last. $59.95

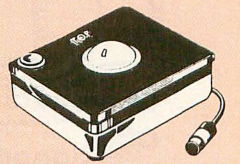
SPRINT Serial-to-Parallel Printer Interface

Zera's SPRINT Serial-to-Parallel printer interface comes preset to 9600 baud and is jumper selectable for 600 to 9600 baud.

SPRINT (for printer with 5V on interrface such as Star, Radio Shack, Okidata) $29.95

SPRINT-PS (for printers without 5V on interface such as Epson, Seikosha, and Panasonic)..... $31.95

WICO Trackball



Plugs into either joystick port and works with all joystick and mouse software. These are very smooth moving and rugged controllers. NOTE: These trackballs don't work very well with Tandy's Hi-Res Interface adaptor.

WICO CoCo Trackball $29.95

Blackjack Royale

A Hi-Res graphics casino blackjack simulation and card counting tutor. Gully realistic play includes: double down, splits, surrender, insurance, 1-8 decks, burnt cards, shuffle frequency and more! CoCo I,II,II 64K..$9.95

FKEYS III

F1 F2

A productibity enchancement tool that gives you the capability to add twenty predifened functions to the CoCo 3 by using the CTRL, F1 & F2 keys! Also, customize your DOS for faster disk I/O, 35 or 40 track, single or double-sided disk drives. "EPROMable" for the utmost in convienience! CoCo II 128K...$14.95

The OS-9 Solution

Now, a program that creates a "USER FRIENDLY" environment within OS-9. OS-9 solution repladces 20 of the old "USER HOSTLE" commands wit5h single keystroke, menyu driven commands. No more typing in complex long pathnames or remembering complicate syntaxex! Works with OS-9 Level I CoCO I, II, II $16.95

CoCo II Screen Dump

This is THE porgram to use to make hardcopies of CoCo II Hi-res graphics with Radio Shack dot-matrix printers (DMP105,130, etc.) and EPSOn compatibles (Star Micronics, Panasonic, etc.) CoCo II Screen Dump will dump HSCREEN 1-4, & PMODE0-4 screens. 16 patterns can be customized for any color on the screen. CoCo III $6.95

CoCo II Font Bonanza PLUS!

Replace the PLAIN CoCo II HPRINT text characters from a menu of INCREDIBLE fonts or use the hi-res editro to modigy or create your own! Two disks include fonts: Modern, Bold, Italics, Bubble, Computer, Fancy, Shadow, Romoan, Outline, Greek, Deco and lots more.! CoCo 3 128K $19.95

Color Max-3 Font Editor

If you own Color Max 3 and want more fonts, this is your answer! The Color Max 3 Font Editor allows you to create or modify hi-res fonts for Color Max 3. Several fonts are included: Crystal, Glyphic, Dowenhill, Old eanglish, Film, and Stripe. (Fonts and editor are also compatible with aThe Newspaper Design System!)...$12.95

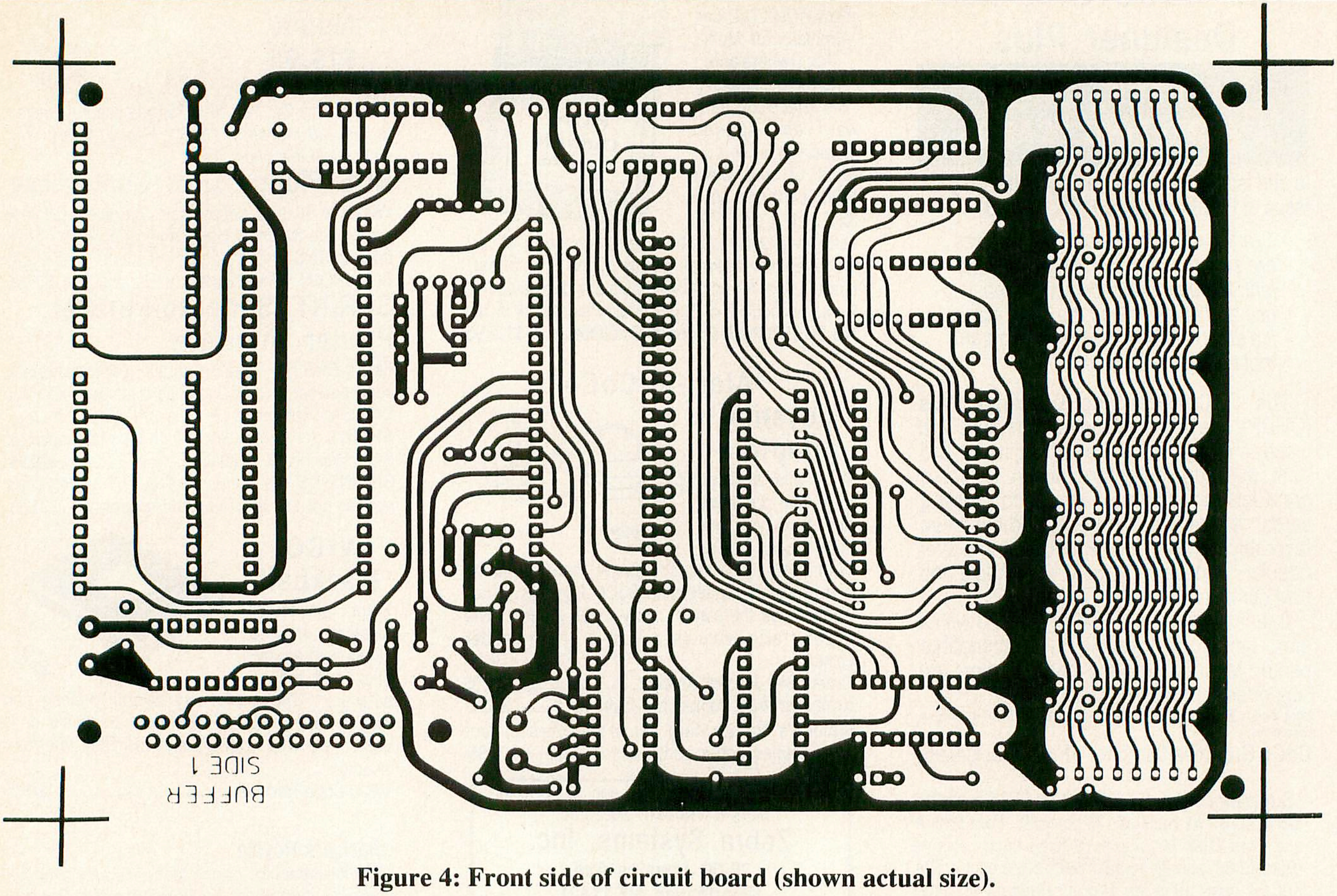

SIDE 1
BUFFER

Figure 4: Front side of circuit board (shown actual size).

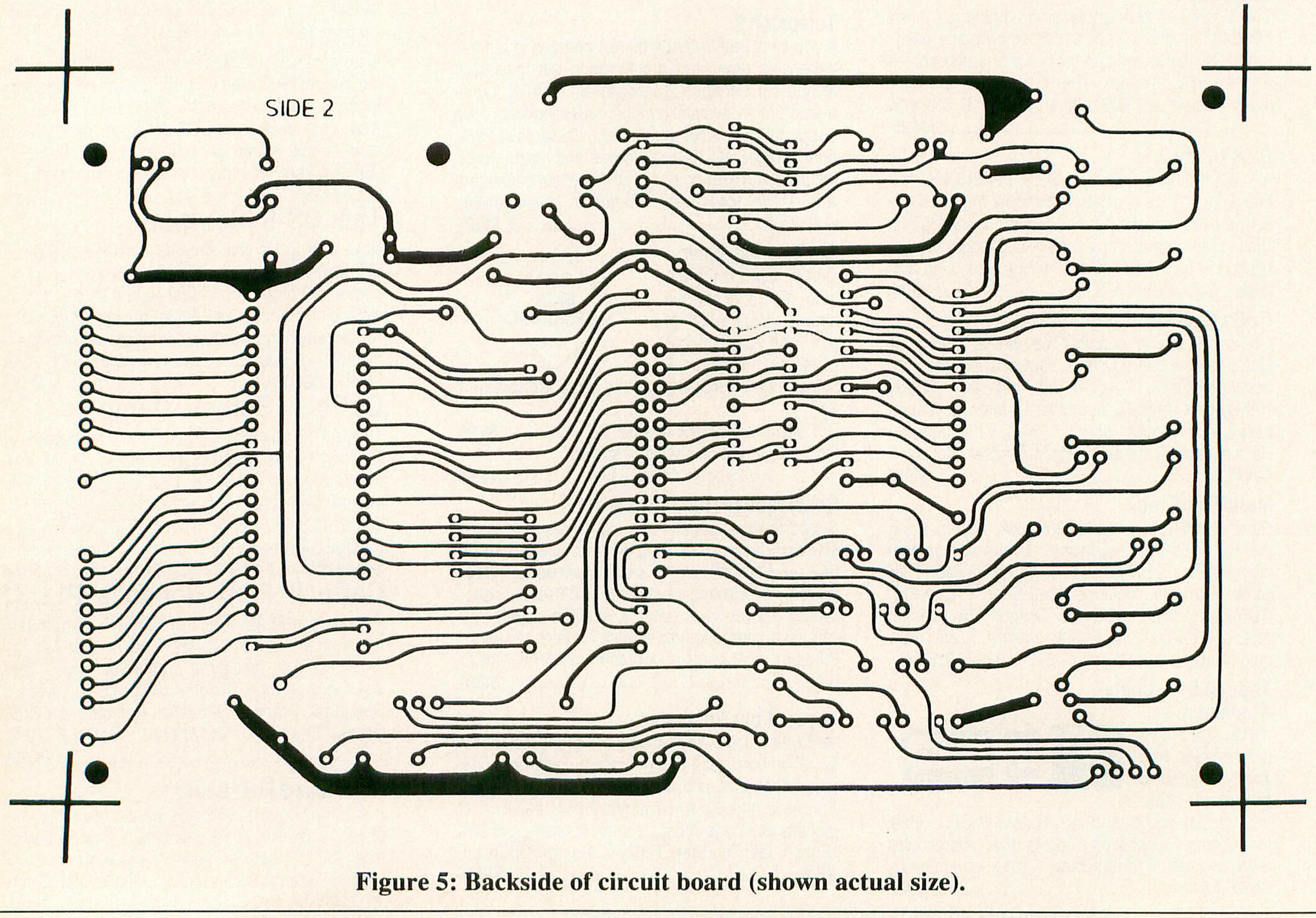


Figure 5: Backside of circuit board (shown actual size).

edge strobe and stores the acquired data. After being incremented the input pointer `BUFIN` is checked to ensure that it remains within the circular-buffer address range by calling subroutine `LIMIT`as shown in the sample listing.

Buffer-status byte `FLAG` is next tested to check whether or not the buffer was previously empty. If so, `FLAG` is cleared and this forces execution of the printer interface interrupt-handler through an SWI instruction. This restarts the DS/ACK handshake after the buffer becomes empty.

Hidden Benefits

A large part of the actual code (See the listing on Page 108.) is common to both serial and parallel communication.

Refreshing of the dynamic RAM is carried out by software, executing a string of no-operation (BRN) every 2ms. This increments the address bus 256 times, which ensures that every column is refreshed through an RAS-only refresh at least once in 2ms.

An output-compare feature on the MC6803 processor is used to generate the periodic 2ms interrupt. The on-chip timer is a free-running incrementing counter which has an associated output-compare register. When the content of this compare register is equal to that of the counter, an interrupt can occur.

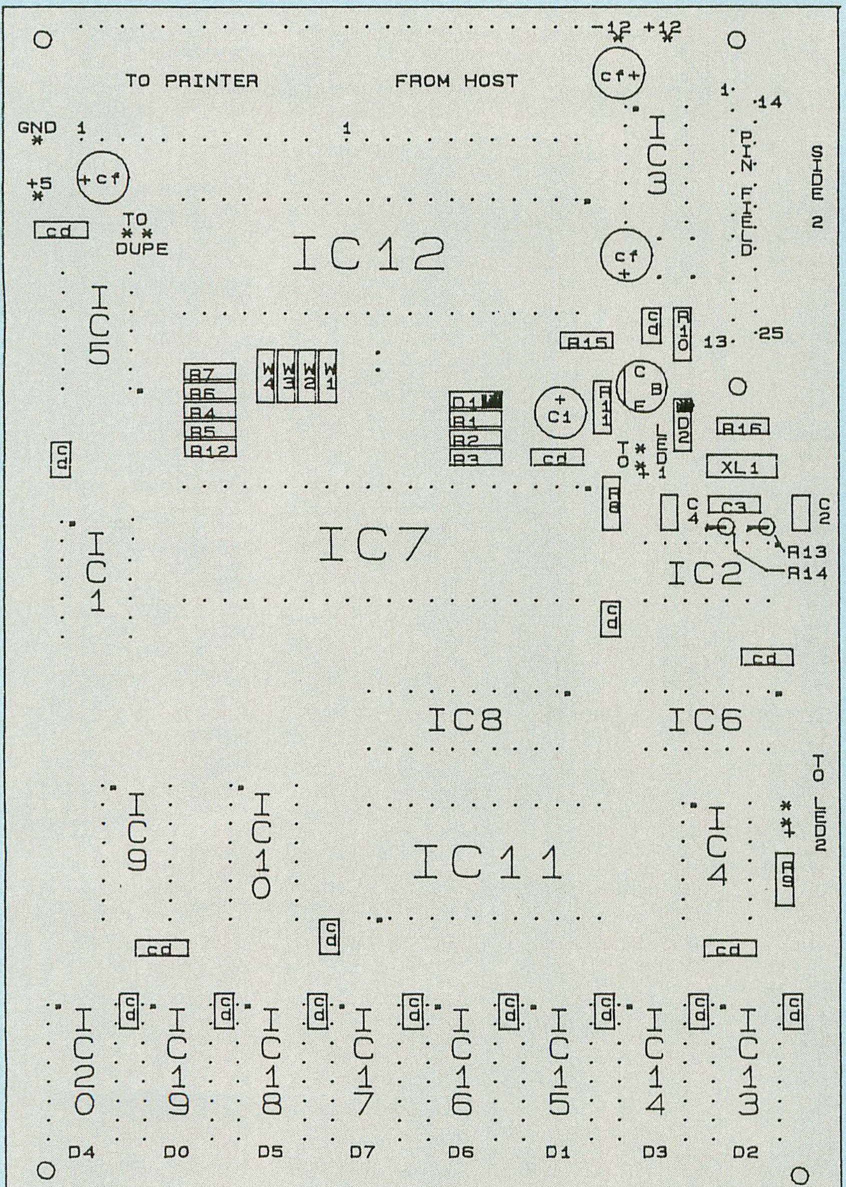
In this system, it is standard that during execution of each RAM refresh module the output-compare register is loaded with the value of the timer plus 2ms. Port P21 is set up to fall when this time elapses, pulling the Non-Maskable Interrupt (NMI) low and causing the RAM refresh handler to be reentered.

Interrupt Priority, as the normal output-compare function, was considered too low for the RAM refresh module. Using Port P21 to activate NMI effectively has moved this Interrupt Priority to the highest position, apart from Reset. For my technique the software execution overhead is about 12 percent, but in this application that is of no real consequence.

We will continue next time with construction and troubleshooting. In the meantime, however, you can start constructing a printed circuit board (See Figures 4 and 5.) and gathering parts (See Figure 6.).

[The printed circuit board (a double-sided board) is available for $25 from the author at the address below. Also available is the programmed EPROM for $10.]

(Questions or comments concerning this project may be addressed to the author at 8332 Peggy Street, Tampa, FL 33615. Please include an SASE when requesting a reply.) ❑



R1 - R7	10K OHMS
R8 - R9	150 OHMS
R10 - R11	3K OHMS
R12	10K OHMS
R13 - R14	2K OHMS
R15 - R16	2K OHMS
R17	2K OHMS
D1 - D2	1N914
XL1	4.9152 MHZ

C1	10 uf
C2 - C4	20 pf
C3	.01 uf
cf	100 uf
cd	.1 uf
Q1	2N3904
IC1	74LS11
IC2	74LS04
IC3	MCM1488

IC4	74LS00
IC5	74LS27
IC6	74LS74
IC7	6803-1
IC8	74LS373
IC9 - IC10	74LS157
IC11	MCM2716
IC12	68A21
IC13 - IC20	4164

Figure 6: Parts placement and parts list.

T & D SOFTWARE PRICE

ISSUE #1, JULY 1982
COVER 1
RACE TRACK
HANGMAN
MUSIC ALBUM
LIFE EXPECTANCY
WORD TESTS
KILLER MANSION
BARTENDER
CALENDAR
ROBOT WAR

ISSUE #2, AUG. 1982
UFO COVER PT. 1
BIORYTHM
BOMBARDMENT
BLACK JACK
COST OF LIVING
FRENZY
BUSINESS LETTER
QUICK THINK
QUEST INSTRUCTIONS
QUEST FOR LENORE

ISSUE #3, SEPT. 1982
UFO COVER PT.2
BASKETBALL
CHUCKLUCK
SLOT MACHINE
ALPHABETIZER
NFL PREDICTIONS
FLAG CAPTURE
ROBOT BOMBER

ISSUE #4, OCT. 1982
UFO RESCUE
TANK BATTLE
DRIVEWAY
SOUNDS
BALLOON DROP
MIND BOGGLE
COCO-TERRESTRIAL ADV.
CALORIE COUNTER
JACK-O-LANTERN

ISSUE #5, NOV. 1982
CATALOG COVER
BOWLING
PROGRAM INVENTORY
PROMISSORY-LOANS
CHECKBOOK BALANCER
TRIGONOMETRY TUTOR
CONVOY
BAG-IT
SPECTRA SOUND
CONVEYOR BELT

ISSUE #6, DEC. 1982
CHRISTMAS COVER
RAINDROPS
STOCK MARKET
ADVANCE PONG
DESTROY
SOUND ANALYZER
CREATIVITY TEST
VOICE DATA
ML TUTORIAL PT.1
LOONY LANDER

ISSUE #7, JAN. 1983
NEW YEARS COVER
LIST ENHANCER
SUPER PRECISION DIV.
BOMB DIFFUSE
SPACE STATION
ML TUTORIAL PT. 2
SHOOT OUT
FIND UTILITY
CYBORG INS.
CYBORG FACES

ISSUE #8, FEB., 1983
COVER 8
DEFEND
3 DIMENSIONAL MAZE
COCO CONCENTRATION
AUTO LINE NUMBERING
ML TUTORIAL PT.3A
ML TUTORIAL PT.3B
NUCLEAR POWER PLANT
DUAL BARRIER
BRICKS

ISSUE #9, MARCH 1983
TIME MACHINE COVER
TRIG DEMO
PYRAMID OF CHEOPS
PROGRAM PACKER
BUDGET
ELECTRONIC DATE BOOK
ML TUTORIAL PT.4
TAPE DIRECTORY
BLOCK-STIR
COCO ADDING MACHINE

ISSUE #10, APRIL 1983
TENTH COVER
PYRAMID OF DANGER
TYPING TUTOR
ML TUTORIAL PT.5
TINYCALC
STOCK MARKET COMP
YAH-HOO
MISSILE ATTACK
SCREEN PRINT
BRIKPONG

ISSUE #11, MAY 1983
ELEVENTH COVER
ARCHERY
FROG JUMP
ML TUTORIAL PT.6
MLT DICTIONARY
BASIC SPEED UP TOT.
METRIC CONVERTOR
GRAPHIC QUAD ANTENNA
GRAPHICS PROGRAM
CATERPILLAR CAVE

ISSUE #12, JUNE 1983
TWELFTH COVER
SHOOTING GALLERY
BOMB STOPPER
VALLEY BOMBER
STAR FIGHTER
WHEEL OF FORTUNE
ML TUTORIAL PT.7
MERGE UTILITY
RAM TEST
LANDER

ISSUE #13, JULY 1983
THIRTEENTH COVER
FLASH CARD
ICE BLOCK
COSMIC FORTRESS
MAIL LIST
DOLLARS & CENTS
ML TUTORIAL PT.8
SDSK COPY
MUSIC SYNTHESIZER
CRAWLER

ISSUE #14, AUG. 1983
MYSTERY COVER
ROW BOAT
COMPUTER TUTL PT. 1
INDEX DATA BASE
DISK ZAPPER
COCO-MONITOR
COCO-ARTIST
ROBOT COMMAND
TEST SCREEN PRINT
HIGH RESOLUTION TEXT

ISSUE #15, SEPT. 1983
MYSTERY COVER PT.2
GOLD VALUES
TREK INSTRUCTIONS
TREK
HIGH TEXT MODIFICATION
ASTRO DODGE
DR. COCO
PEG JUMP
MORSE CODE
PURGE UTILITY

ISSUE #16, OCT. 1983
MYSTERY COVER
BOPOTRON
DIRECTORY RECALL
VECTOR GRAPHICS INST.
VECTOR GRAPHICS
SKYDIVER
SWERVE AND DODGE
NIMBO BATTLE
TAPE ANALYSIS UTILITY
LIFE GENERATIONS

ISSUE #17, NOV. 1983
THANKSGIVING COVER
3-D TIC-TAC-TOE
INDY 500
COLLEGE ADVENTURE
MEMORY GAME
DUNGEON MASTER
WEATHER FORECASTER
GRID FACTOR INST.
GRID FACTOR
DRAW

ISSUE #18, DEC. 1983
CHRISTMAS COVER
CLIMBER
GALACTIC CONQUEST
WARLORDS
STATES REVIEW
MATH TUTOR
MACHINE LANGUAGE DATA
PRINTER UTILITY INST.
PRINTER UTILITY
MUTANT WAFFLES

ISSUE #19, JAN. 1984
BANNER
PROBE
DISK DIR. PROTECTOR
OPTICAL CONFUSION
WORD PROCESSOR
WORD SEARCH
ASTRONAUT RESCUE
STAR TRAP
PIE CHART
FORCE FIELD

ISSUE #20, FEB. 1984
INTRODUCTION
HINTS FOR YOUR COCO
ESCAPE ADVENTURE
SEEKERS
MASTER BRAIN
LIST CONTROLLER
DISKETTE CERTIFIER
ROM COPY
BASIC RAM
SNAFUS

ISSUE #21, MAR. 1984
BASIC CONVERSIONS
FINANCIAL ADVISE
CASTLE STORM
DOS HEAD CLEANER
COCO TERMINAL
SNAKE CRAWLER
WAR CASTLE
SKY FIRE
EASY BASIC
DOTS 3-D

ISSUE #22, APRIL 1984
HEALTH HINTS
GLIBLIBS
CLOTHER SLITHER
BIBLE 1 & 2
BIBLE 3 & 4
CATCH ALL
INVADER
ALIEN RAID
MOON ROVER
IO ERROR IGNORER

ISSUE #23, MAY 1984
MONEY SAVERS 1 & 2
STOCKS OR BOMBS
WALL AROUND
COCO TECHNICAL LOOK PT.1
NUCLEAR WAR INST.
THERMONUCLEAR WAR
CIRCUIT BREAKER
MOUSE RACES
SUPER SQUEEZE
DATA FALL

ISSUE #24, JUNE 1984
DIR PACK & SORT
BRICK OUT
COCO TECHNICAL LOOK PT. 2
USA SLIDE PUZZLE
51 *24 SCREEN EDITOR
51 *24 SCREEN EDITOR
CITY INVADERS
PRINTER SPOOLER
STEPS
SNAKE

ISSUE #25, JULY 1984
CLOCK
COCO TECHNICAL LOOK PT.3
SKID ROW ADVENTURE
MONEY MAKER
PIN-HEAD CLEANING
LINE EDITOR INST.
LINE EDITOR
BOOMERANG
BUBBLE BUSTER
ROCOCHET

ISSUE #26, AUG. 1984
PEEK POKE & EXECUTE
SAUCER RESCUE
YOUNG TYPER TUTOR
O-TEL-O
OLYMPIC EVENTS
DOUBLE DICE
COCO DATABASE
BATTLE STAR
COCO-PIN BALL
MONTEZUMAS DUNGEONS

ISSUE #27, SEPT. 1984
COCO TO COM 64
GALACTIC SMUGGLER
INDY RACE
ACCOUNT MANAGER
CASSETTE MERGE UTILITY
STRING PACKING TUTORIAL
SPACE DUEL
BUGS
TRAP-BALL
BALLOON FIRE

ISSUE #28, OCT. 1984
HANGING TREE
CHECKERS
FOOTBALL
MORE PEEKS & POKES
SPELLING CHECKER
SOUND DEVELOPMENT
WORD GAME
SCREEN REVERSE
AUTO COPY
RAT ATTACK

ISSUE #29, NOV. 1984
DISK ROLL OUT
ROBOT ON
MULTIPONG
ADVENTURE GENERATOR
QUEST ADVENTURE
QUARTER BOUNCE
DUAL OUTPUT
KEY REPEAT
FULL EDITOR
METEOR

ISSUE #30, DEC. 1984
MATH HELP
ZECTOR ADVENTURE
WORLD CONQUEST
DRAG RACE
MINE FIELD
T-NOTES TUTORIAL
T & D PROGRAM INDEXER
SYSTEM STATUS
ERROR TRAP
DROLL ATTACK

ISSUE #31, JAN. 1985
TREASURES OF BARSOOM
BATTLEGROUND
STRUCT. COMPILED LANG.
MINIATURE GOLF
STAR DUEL
ARITHMETIC FOOTBALL
GRID RUN
SPIRAL ATTACK
FAST SORT
MUNCHMAN

ISSUE #32, FEB. 1985
DR. SIGMUND
ICE WORLD ADVENTURE
LOTTERY ANALYST
BASIC COMPILER
MUSIC CREATOR
MEANIE PATROL
TRI-COLOR CARDS
SHAPE RECOGNITION
DISK BACKUP
SPACE PROTECTOR

ISSUE #33, MAR. 1985
LIGHT CYCLE
PAINT
SKEET SHOOTING
GUITAR NOTES
MI DISK ANALYZER
PERSONAL DIRECTORY
NAUGHA ADVENTURE
EGGS GAME
DISK DIRECTORY PRINT
SPEED KEy

ISSUE #34, APRIL 1985
HOVER TANK
POWER SWORD
TERMITE INVASION
SPELLING CHECKER
DOS BOSS
NINE CARD CHOICE
MUSIC GENERATOR
FYR-DRACA
DRIVE TEST
GRAPHIC TOUR

ISSUE #35, MAY 1985
SELECT A GAME 1
TAPE PROBLEMS
STROLL TRIVIA
SOFTBALL MANAGER
FONTS DEMO
CLOWN DUNK MATH
ALPHA MISSION
DOS ENHANCER
KNOCK OUT
HAUNTED HOUSE

ISSUE #36, JUNE 1985
SELECT A GAME 2
VIDEO COMPUTER
SPEECH SYNTHESIS
SPEECH RECOGNITION
SPACE LAB
AUTO COMMAND
COMPUTER MATCHMAKER
KNIGHT & THE LABYRINTH
STAR SIEGE
TALKING SPELLING QUIZ

ISSUE #37, JULY 1985
CHESS MASTER
BIBLE 5-7
SHIP WREK ADVENTURE
FILE TRANSFER
FOUR IN A ROW
MARSHY
TAPE CONTROLLER
CATACOMB
AUTO TALK
SGR8PAK

ISSUE #38, AUG. 1985
GOLF PAR3
WIZARD ADVENTURE
KITE DESIGN
ROBOTS
GOMOKU
AMULET OF POWER
LINE COPY UTILITY
DISK PLUMBER
SUPER RAM CHECKER
GRAPHIC HORSE RACE

ISSUE #39, SEPT. 1985
DRUNK DRIVING
CAR MANAGER
SQUEEZE PLAY
SUPER BACKUP
RECIPE MACHINE
ANTI-AIRCRAFT
UNREASON ADVENTURE
TALKING ALPHABET
SUPER VADERS
AUTOMATIC EDITOR

ISSUE #40, OCT. 1985
STAR TREK
HAM RADIO LOG
COCO WAR
DISK LABELER
SHIP WAR
ELECTRIC COST
MULTIKEY BUFFER
NUKE AVENGER
CURSOR KING
SAND ROVER

ISSUE #41, NOV. 1985
GRUMPS
DISK DRIVE SPEED TEST
SOLAR CONQUEST
GAS COST
RIME WORLD MISSION
WUMPUS
CHARACTER EDITOR
GRAPHIC TEST
GRAPHIC LOOPY
BOLD PRINT

ISSUE #42, DEC. 1985
HOME PRODUCT EVALUATION
YAHTZEE
DISK UTILITY
MACH II
ELECTRONIC BILLBOARD
CAR CHASE
SUPER MANSION ADVENTURE
SLOT MACHINE GIVE AWAY
TEXT BUFFER
TUNNEL RUN

MasterCard

VISA

SUPER SAVINGS

Single Issue	**$ 8.00 ea.**
2-5 Issues	**$ 6.00 ea.**
6-10 Issues	**$ 5.00 ea.**
11 or more Issues	**$ 4.50 ea.**
All 80 Issues	**$220.00**

Purchase 20 or more issues and receive a free 6 month subscription.

- Every Issue Contains 10 or More Programs
- Many Machine Language Programs
- Available for COCO I, II and III
- All Programs Include Documentation

- We send 1st Class No Charge
- Personal Checks Welcome!

RAINBOW
CERTIFICATION
SEAL

BLOWOUT SALE

ISSUE #43, JAN. 1986
DUELING CANNONS
WATER COST
ZIGMA EXPERIMENT
MUSICAL CHORDS
SAFE PASSAGE
PASSWORD SCRAMBLER
GUNFIGHT
KEYPAD ENTRY
STYX GAME
PRINTER DIVERT

ISSUE #44, FEB. 1986
HOME INVENTORY
NINE BALL
PRINTER REVIEW
EXPLORER ADVENTURE
SPANISH LESSONS
CROSS FIRE
RAM SAVER
GRAY LADY
JOYSTICK INPUT
COSMIC SWEEPER

ISSUE #45, MAR. 1986
INCOME PROPERTY MGMT.
ELECTRONIC BILLBOARD 2
MOUNTAIN BATTLE
THE FIGHT
COCO KEENO
HOCKEY
LOGICAL PATTERNS
ON SCALE SCREEN
LIBERTY SHIP
SINGLE STEP RUN

ISSUE #46, APRIL 1986
SPECIAL EVENTS REMINDER
DISK LOCK
SMALL BUSINESS MANAGER
BOMB RUN
TANKS
TAR PITS
BASEBALL
NUMBER RELATIONSHIPS
ROULETTE
GLOBAL EDITOR

ISSUE #47, MAY 1986
CHRISTMAS LIST
BLACK HOLE
PITCHING MANAGER
SYMBOLIC DIFF.
BUG SPRAY
OWARE CAPTURE
EASY GRAPHICS
DESERT JOURNEY
SCREEN CONTROL
FULL ERROR MESSAGE

ISSUE #48, JUNE 1986
CHESTER
TV SCHEDULE
BASE RACE
ROMAN NUMERALS
ASTRO DODGE
HIRED AND FIRED
MULTI COPY
AUTO MATE
SCROLL PROJECT
NOISE GENERATOR

ISSUE #49, JULY 1986
COMPUTER I.O.U.
DISK DISASSEMBLER
BAKCHEK
PACHINKO
STOCK CHARTING
HAUNTED STAIRCASE
CANYON BOMBERS
DRAGONS 1 & 2
GRAPHIC SCROLL ROUTINE
AUTO BORDER

ISSUE #50, AUG. 1986
BUSINESS INVENTORY
D & D ARENA
DISK CLERK
PC SURVEY
TREASURE HUNT
SCREEN GENERATOR
ASTRO SMASH
NFL SCORES
BARN STORMING
SMASH GAME

ISSUE #51, SEPT. 1986
ASSET MANAGER
MONEY CHASE
FISHING CONTEST
RIP OFF
HAND OFF
BUDGET 51
VAN GAR
DOS EMULATOR
MEM DISK
VARIABLE REFERENCE

ISSUE #52, OCT. 1986
ACCOUNTS RECEIVABLE
WORKMATE SERIES
CALENDAR
INVASION
THE TRIP ADVENTURE
FOOT RACE
FLIPPY THE SEAL
SCREEN CALCULATOR
ABLE BUILDERS
SUPER ERROR2

ISSUE #53, NOV. 1986
CORE KILL
LUCKY MONEY
COOKIES ADVENTURE
NICE LIST
SPANISH QUIZZES
PAINT EDITOR
CARVERN CRUISER
SNAP SHOT
MEGA RACE
KICK GUY

ISSUE #54, DEC. 1986
JOB LOG
PEGS
DIGITAL SAMPLING
JUNGLE ADVENTURE
PAINT COCO 3
CONVERT 3
COMPUTER TYPE
PANZER TANKS
MRS PAC
BIG NUM

ISSUE #55, JAN. 1987
GRADE BOOK
MAIL LIST
DOWN HILL
FIRE FOX
JETS CONTROL
GALLOWS
DIR MANAGER
FIRE RUNNER
GRAPHICS BORDER
COSMIC RAYS

ISSUE #56, FEB. 1987
CALENDAR PRINT
CRUSH
GALACTA
OCEAN DIVER
CLUE SUSPECT
WORD EDITOR
ALIEN HUNT
DEMON'S CASTLE
PICTURE DRAW
DIG

ISSUE #57, MAR. 1987
THE BAKERY
ENCHANGED VALLEY ADV.
SAFE KEEPER
WAR 1
BOMB DISABLE
PIANO PLAYER
SPREAD SHEET
SLOT MANEUVER
LIVING MAZE
GEM SEARCH

ISSUE #58, APRIL 1987
ACCOUNTS PAYABLE
PRINTER GRAPHICS
SIMON
PANELING HELPER
MULTI CAKES
CAR RACE
ELECTRONICS I
BATTLE TANK
DISKETTE VERIFY
WEIRDO

ISSUE #59, MAY 1987
GENEOLOGY
HOME PLANT SELECTION
CHECK WRITER
HELIRESCUE
KABOOM
NEW PONG
CROQUET
FUNCTION KEYS
ZOOM
ELECTRONICS 2

ISSUE #60, JUNE 1987
JOB COSTING
LABELS
CATCH A CAKE
COCO MATCH
ROBOTS
STREET RACERS
BOWLING 3
ELECTRONICS 3
GRAFIX
KRON

ISSUE #61, JULY 1987
EZ ORDER
SUBMISSION WRITER
KEYS ADVENTURE
WALLPAPER
CHOPPER COMMAND
UNDERSTANDING OPPOSITES
BIT CODE PLOTTING
ELECTRONICS 4
KING PEDE
RAIDER

ISSUE #62, AUG. 1987
PENSION MANAGEMENT
HERB GROWING
CATOLOGER UTILITY
RAIDERS
ALPHABETIZING
U.F.O.
ELECTRONICS 5
RAMBO ADVENTURE
BLOCKS
MULTI SCREEN CAVES

ISSUE #63, SEPT. 1987
GENEOLOGIST HELPER
SMART COPY
MAINTENANCE REPORTING
COCO3-COCO 2 HELPER
DIRECTORY PICTURE
SUB ATTACK
SAVE THE MAIDEN
CAVIATOR
ELECTRONICS 6
MONKEY SHINE

ISSUE #64, OCT. 1987
GARDEN PLANTS
FORT KNOX
ELECTRONICS FORMULAS
SNAKE IN THE GRASS
CYCLE JUMP
GEOMETRY TUTOR
WIZARD
GAME OF LIFE
ELECTRONICS 7
FLIGHT SIMULATOR

ISSUE #65, NOV. 1987
TAXMAN
DAISY WHEEL PICTURES
CHILDSTONE ADVENTURE
SIR EGGBERT
CROWN QUEST
GYM KHANA
COCO 3 DRAWER
FOOTBALL
ELECTRONICS 8
CHOP

ISSUE #66, DEC. 1987
ONE ROOM ADVENTURE
OS9 TUTORIAL
RIVER CAPTAIN
SOUND EFFECTS
BETTING POOL
ADVANCE
MATH TABLES
ELECTRONICS 9
LOWER TO UPPER
NOIDS

ISSUE #67, JAN. 1988
AUDIO LIBRARY
SAVE THE EARTH
WEIGHTS AND MEASURES
LOW RES PICTURES
WORD COUNTER
BACARAT
BATTLE SHIP
ELECTRONICS 10
TAPE CONVENIENCE
PENQUIN

ISSUE #68, FEB. 1988
COINFILE
WORD COUNTER
SQUIRREL ADVENTURE
AREA CODES
DRAW POKER
TURTLE RACES
ELECTRONICS 11
MULTI SCREEN
CANON PRINT
COCO TENNIS

ISSUE #69, MAR. 1988
POLICE CADET
STAMP COLLECTION
BARRACKS ADVENTURE
CITY/TIME
HI-LO/CRAPS
OLYMPICS
HI-RES CHESS
ELECTRONICS 12
DOUBLE EDITOR
DOUBLE BREAKOUT

ISSUE #70, APRIL 1988
BLOTTO DICE
SUPER COM
GENESIS ADVENTURE
PLANETS
PHK/WAR
SIGN LANGUAGE
ARX SHOOTOUT
ELECTRONICS 13
MAGIC KEY
SNAP PRINT

ISSUE #71, MAY 1988
SUPER LOTTO
ROBOT ADVENTURE
MAZE
YAHTZEE 3
PHASER
SHAPES & PLATES
STAR WARS
ELECTRONICS 14
PRINTER CONTROL
MAZE 2

ISSUE #72, JUNE 1988
FLYING OBJECTS
THREE STOOGES
HOSTAGE
PROGRAM TRIO
GLADIATOR
US & CAN QUIZ
JEOPARDY
ELECTRONICS 15
COCO 3 PRINT
CTTY COMMUNICATOR

ISSUE #73, JULY 1988
FOREIGN OBJECTS
CHESS FUNDAMENTALS
WATERFOWL QUIZ
WHAMMY 3
ADVENTURE TUTORIAL
CIRCLE 3
EDUCATIONAL TRIO
WRITE-UP EDITOR
PICTURE PACKER
AIR ATTACK

ISSUE #74, AUGUST 1988
VIDEO CATALOG 3
ONE EYE WILLIE
JAVA
GAME TRIO
CRIONAUT WARRIOR
ENVELOPE PRINT
RAM DRIVE 3
MODE 2 UTILITY
XMODEM TRANSFER
CAVE II

ISSUE #75, SEPT. 1988
DRACULA HUNT
HELP TRIO
SHOWDOWN DICE
TARZAR 1 ADVENTURE
ARAKNON
CASHFLOW REPORTING
GRAPHIC LETTER
GRAPHIC EDITOR
ADDRESS BOOK
SQUARES

ISSUE #76, OCT. 1988
SUPER BLITZ 3
CHAMBERS
TRIO RACE
EARTH TROOPER
STARGATE
BOWLING SCORE KEEP
JOYSTICK TO KEYBOARD
KEYBOARD TO JOYSTICK
DISK TUTORIAL
SAILORMAN

ISSUE #77, NOV. 1988
POLICE CADET #2
STARSHIP SHOWDOWN
MUSIC COMPOSER
COUPONS/REBATES
PROGRAM LIBRARY
BOY SCOUT SEMAFORE
HOUSEHOLD CHORES
MAXOMAR ADVENTURE
CHUCK LUCK 3
BUZZARD BATE

ISSUE #78, DEC. 1988
POLICE CADET #3
TANK TURRET
WAR OF THE WORLDS
SPINSTER CAFE
COCO SIZE
SIGN MAKER
LEGAL DEDUCTIONS
BOOKKEEPING
CAR LEASE 3
WAREHOUSE MUTANTS

ISSUE #79, JAN. 1989
POLICE CADET #4
POKER 3
TILER TEX
BATTLE
INSIDE THE COCO
COCO B.B.S.
HOT DIRECTORY
VCR TUTORIAL
PRINTER CONTROLLER
THE KING

ISSUE #80, FEB, 1989
SCRABBLE
SPELLING CHECKER
SANDSTONE
FAMILY FEUD
HARNESS RACING
MINI GOLF 3
ULTIMATE TERMINAL 3
NETWORK TUTORIAL
THE NETWORK
MONEYOPOLY

Gentlemen,
"I just received my first order and I am very pleased! Enclosed is a check for all the remaining back issues plus a 1-year subscription."
Gary Rhodes
Fontana, CA

Dear T&D
"As the Computer Instructor for our school, I have been a subscriber to T&D software for two years. I love your programs. The quality is excellent!"
Barry R. Goblin
Staten Island, NY

MAIL TO:

T & D Subscription Software
2490 Miles Standish Drive
Holland, Michigan 49424
(616) 399-9648

Name ____________________
Address ____________________
City __________ State ________ Zip ________
Credit Card# ____________________
Expires ____________________
TOTAL AMOUNT$ ____________________
One Year Subscription ONLY $60.00!!

CIRCLE ISSUES DESIRED

1	9	17	25	33	41	49	57	65	73
2	10	18	26	34	42	50	58	66	74
3	11	19	27	35	43	51	59	67	75
4	12	20	28	36	44	52	60	68	76
5	13	21	29	37	45	53	61	69	77
6	14	22	30	38	46	54	62	70	78
7	15	23	31	39	47	55	63	71	79
8	16	24	32	40	48	56	64	72	80

PLEASE CIRCLE
TAPE or DISK

1007	28
1016	173
1025	145
1034	205
1044	65
1050	188
1062	100
END	174

The Listing: HECONOMY

```
10 REM HECONOMY
20 REM START ADDRESS 18432(4800)
30 REM END ADDRESS 20479(4FFF)
40 FOR X=18432 TO 20479
50 READ A$
60 A$="&H"+A$
70 POKE X,VAL(A$)
80 NEXT X
1000 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1001 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1002 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1003 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1004 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1005 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1006 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1007 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1008 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1009 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1010 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1011 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1012 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1013 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1014 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1015 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1016 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1017 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1018 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1019 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1020 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1021 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1022 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1023 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1024 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1025 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1026 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1027 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1028 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1029 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1030 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1031 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
```

```
1032 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1033 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1034 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1035 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1036 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1037 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1038 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1039 DATA FF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,04,FF,FF,FF,FF,FF,FF,FF
1040 DATA FF,FF,FF,FF,FF,FF,FF,F
F,8E,00,4F,86,20,97,02,86,50,97,
00,86,12,97,03,97,01,86,10,97,08
1041 DATA CC,09,97,DD,0B,86,FF,B
7,FC,02,86,3E,B7,FC,01,B7,FC,03,
86,2E,B7,FC,01,B7,FC,03,BD,FD,7E
1042 DATA 86,7E,97,23,97,20,CE,F
E,74,DF,21,FE,FE,D0,DF,24,D6,02,
C4,0C,54,54,D7,2F,26,02,8D,72,5A
1043 DATA 26,0A,8D,6D,86,2F,B7,F
C,03,01,01,01,5A,26,07,8D,71,86,
2F,B7,FC,01,5A,26,0A,86,2F,B7,FC
1044 DATA 01,B7,FC,03,01,01,5F,C
E,FC,80,3A,A6,00,CE,00,50,3A,A7,
00,5C,81,04,26,EF,DF,2A,CC,FB,FF
1045 DATA DD,26,DD,2C,7F,00,2E,0
E,96,2F,26,1A,8D,29,96,02,44,25,
FB,8D,16,8D,4E,8D,2F,8D,57,24,F6
1046 DATA 96,02,44,24,F7,8D,41,2
0,E6,3F,8D,49,20,FC,86,05,CE,00,
00,09,26,FD,4A,26,F7,39,CE,FD,C7
1047 DATA DF,24,96,11,96,12,86,1
A,97,11,20,11,20,0F,CE,FE,50,DF,
24,DF,21,96,11,86,0E,97,11,86,FF
1048 DATA 97,13,39,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,C6,05,96,02,
84,02,26,02,CB,08,D7,10,39,96,02
1049 DATA 0D,2B,2C,DE,26,8D,29,D
F,2A,01,01,86,AA,97,2E,8D,A6,96,
02,2B,16,CC,00,4F,DD,26,96,02,8A
1050 DATA 40,97,02,2A,F8,BD,FD,4
4,96,2F,27,01,3F,0C,84,AF,97,02,
39,08,8C,FC,00,25,03,CE,00,50,39
1051 DATA D6,11,96,12,DE,2A,9C,2
6,26,04,C6,40,20,06,A7,00,8D,E4,
DF,2A,58,2A,06,D6,02,CA,40,D7,02
1052 DATA 96,02,85,10,26,34,DC,2
A,C3,10,00,9C,26,25,0E,83,FB,FF,
23,26,C3,00,50,93,26,23,1F,20,04
1053 DATA 93,26,23,19,21,FE,21,F
C,8A,10,97,02,DC,26,C3,00,FF,DD,
28,83,FB,FF,23,05,C3,00,50,DD,28
1054 DATA 20,23,96,02,8A,10,97,0
2,DE,2A,9C,26,26,07,86,2E,B7,FC,
01,20,1C,96,02,84,EF,97,02,B6,FC
1055 DATA 00,A7,00,BD,FD,BD,DF,2
A,96,2E,27,08,7F,00,2E,96,2F,27,
01,3F,3B,96,11,85,80,27,1C,96,12
1056 DATA 81,13,26,16,86,0A,97,1
1,0E,96,11,85,80,27,FA,96,12,81,
11,26,F4,0F,86,0E,97,11,20,07,B6
1057 DATA FC,02,96,08,96,0D,DE,2
6,BD,FD,BD,DF,26,9C,2A,26,0F,09,
DF,26,96,2F,26,04,86,0A,97,11,97
1058 DATA 2E,20,38,A6,00,B7,FC,0
2,D6,2F,54,21,02,97,13,96,02,85,
10,27,26,54,25,0C,DE,28,9C,26,22
1059 DATA 1D,20,15,20,13,20,11,B
6,FC,00,DE,2A,A7,00,BD,FD,BD,DF,
2A,86,2F,B7,FC,01,96,02,84,EF,97
1060 DATA 02,BD,FD,8B,3B,86,11,9
7,08,DC,09,C3,00,20,DD,0B,01,21,
6E,21,6C,21,6A,21,68,21,66,21,64
1061 DATA 21,62,21,60,21,5E,21,5
C,21,5A,21,58,21,56,21,54,21,52,
21,50,21,4E,21,4C,21,4A,21,48,21
1062 DATA 46,21,44,21,42,21,40,2
1,3E,21,3C,21,3A,21,38,21,36,21,
34,21,32,21,30,21,2E,21,2C,21,2A
1063 DATA 21,28,21,26,21,24,21,2
2,21,20,21,1E,21,1C,21,1A,21,18,
21,16,21,14,21,12,21,10,21,0E,21
1064 DATA 0C,21,0A,21,08,21,06,2
1,04,21,02,21,00,21,FE,21,FC,21,
FA,21,F8,21,F6,21,F4,21,F2,21,F0
1065 DATA 21,EE,21,EC,21,EA,21,E
8,21,E6,21,E4,21,E2,21,E0,21,DE,
21,DC,21,DA,21,D8,21,D6,21,D4,21
1066 DATA D2,21,D0,21,CE,21,CC,2
1,CA,21,C8,21,C6,21,C4,21,C2,21,
C0,21,BE,21,BC,21,BA,21,B8,21,B6
1067 DATA 21,B4,21,B2,21,B0,21,A
E,21,AC,21,AA,21,A8,21,A6,21,A4,
21,A2,21,A0,21,9E,21,9C,21,9A,21
1068 DATA 98,21,96,21,94,21,92,2
1,90,21,8E,21,8C,21,8A,21,88,21,
86,21,84,C3,09,9A,DD,0B,86,10,97
1069 DATA 08,3B,FF,FF,FF,FF,FF,F
F,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,
FF,FF,FF,FF,FF,FF,FF,FF,FF,FF,FF
1070 DATA FF,FF,00,23,FC,90,FC,9
0,FE,74,FE,20,00,20,FE,D1,FC,90
```

A program for keeping softball statistics

FunStats

By Delbert Baker

For some time now it has been my opinion that the Color Computer can do just about anything the larger, more powerful and much more expensive computers can do. It just takes a little more time and perhaps a few more tedious tasks such as disk and program swapping. Thanks to its powerful BASIC, it does some things better.

Recently, I decided to use the CoCo to keep statistics on my softball team. I shopped for statistics programs but found most were for serious statistics. We play softball for fun and keep our statistics for fun too. So I wrote *FunStats*. I used it to keep the offensive statistics for our softball team, the Buffaloes, last season. It was not entirely fun writing and debugging the program, but it was enjoyable to pass out stat sheets to everyone.

FunStats is not just one but several programs. I started out making it just one program, but it kept growing until there wasn't enough memory for efficient string manipulations, of which it has many.

The basic functions are covered by the programs, `FUNSTATS` (Listing 1) and `RSTRMKR` (Listing 2). The other programs accomplish special or unusual functions.

`RSTRMKRR` (*RoSTeRMaKeR*) is used at the start of the season to set up the roster as a direct-access file containing the players' full names, addresses, phone numbers and cumulative statistics. It is a direct-access file because after each game is entered, the cumulative statistics are updated.

`FUNSTATS` is the real workhorse of the group. It is used to enter the individual game files, print or display the statistics for a single game or the totals-to-date, and print or display the roster entries. The game entry module does several things: prompts you for the individual performance data, calculates the averages, stores the data and averages for a game in a sequential file, updates the performance totals, recalculates the total averages, and restores the total data and averages in the roster file.

The display module prompts you for a game file or totals-to-date display. It then reads the necessary file and prints it to the screen. The print module prompts you again for a game file or totals-to-date. It then reads the necessary file and prints a report with an abbreviated name and all the proper statistics. The roster review module prints the full name, address and phone number of each player to the screen.

An accessory program, `COPYFILE` (Listing 6), can be used to keep a backup copy of your data disk on a one-drive system. The program prompts you first to choose a roster file or a game file to copy. If you choose to copy a game file, it then prompts you for a game number if necessary. The proper file is read into an array and you are prompted to place the destination disk in the drive. It then stores the chosen file on the new disk. (A note to JDOS and other enhanced-DOS users: You don't need `COPYFILE` and all the other programs to work as well in JDOS as Disk BASIC.

Another accessory program, `RSTRFXR` (Listing 3), or *RoSTeRFiXeR*, recalculates the totals for the roster file. While entering a game file, I made a mistake and did not discover it in time to correct it. The first time I used it, I realized that I could use these same features in a program to prepare special files or reports for perhaps a weekend tournament or a particular month. So I rewrote it to include the special file and report printing routines. I'll say more about this later.

Delbert Baker is an analytical chemist for the U.S. Bureau of Mines. FunStats represents an encounter between two of his favorite hobbies.

Using the Roster Maker

After you have `RSTRMKR` typed in, saved to disk and loaded into memory, there are a few things to do before using it. First, go to Line 160 and change `C1$` and `C2$` to the city names you will be using, remembering to limit the city, state and ZIP entry to no more than 20 characters. `C1$` and `C2$` are simply shortcuts so that the same city name does not have to be typed many times. If you wish, you can eliminate their use entirely by deleting lines 160 and 270, and deleting `12 INPUT` from Line 260 so the program responds only to a string input. You may also add more cities by defining more strings, adding to the prompt on Line 260, and adding an `ELSE IF` statement to Line 270 for each new city string.

For optional changes, the program is `DIM`ensioned to allow a maximum roster of 20 players. (Our local city softball league allows only 20 players on a roster.) If you need a longer roster, change *all* the `DIM`ension statements to reflect the number you need. (Notice that all these programs are `DIM`ensioned the same, so any change in one program should be repeated in any other program used.) If you are going to keep the statistics for more than one team, you may want to change the word `ROSTER` in Line 190 to identify the team. Again, notice that all the programs use the same conventions in calling the roster file so that any change in one program must be repeated in the other programs. And finally, if you do not want your roster sorted (for instance, to keep your roster in accord with the basic batting order), you can delete the sort without harm to the operation of the program. To do this, delete lines 310 to 390 and the `PRINT@12"SORTING"` statement from Line 300.

Now save your customized version to a working disk and a backup disk, then type `RUN` and start using it.

You are first asked for the season. The program uses the last two characters you enter added to the word `ROSTER` to form `F1$`, which is then used to name the roster file. (The roster file is called using `F1$` and uses Buffer 2 in these programs.)

Next, you are prompted for player information — the player's first and last name, address, city, state, ZIP and phone number. There is room for 24 characters of first and last name; 30 characters of address; 20 characters of city, state and ZIP code; and eight characters (including the hyphen) of the phone number.

When finished entering players, type `STOP` and press ENTER to end the session and move on to the sort. `STOP` must be typed in capital letters because there is a programmed SHIFT-0 when entering players so that lowercase letters can be used in the printout.

Next, you are prompted to select the screen or disk for output or to quit. Selecting the screen produces a three-at-a-time display of player information just entered and then returns you to the prompt when finished. Selecting Disk stores the roster file on the working disk and again on the backup disk. Finally, selecting Quit closes the file and exits to BASIC.

Now you are ready to go on to FUNSTATS.

Using *FunStats*

Once FUNSTATS is in memory, go to lines 1080, 1090, 5040 and 5050 and change the word BUFFALOES to your own team name. The team name is part of the program so you don't have to type it in every time you enter a game. It is not stored with any of the disk files.

Next, if you changed the word ROSTER in RSTRMKR, go to Line 280 and change the word ROSTER to the same thing. If you don't, the program will go looking for a file called ROSTER — and won't find it. If you changed the DIM statements in RSTRMKR, go to lines 170 to 240 and change those DIM statements also. For the two DIMensional arrays, the first is the number of players, the second is the number of statistics entries for each player. U, SU$ and SA$ are temporary variables used in the program and are DIMensioned to match the number of statistics entries.

Save your customized program to both a working and backup disk.Type RUN and press ENTER . Now we'll go into actually using FUNSTATS, module by module.

The first FUNSTATS module is the game entry module, reached by selecting 1 from the menu. The screen is cleared and you are asked for a game number, the name of the opposing team, whether your team is the home team or not, the number of runs scored by each team, and the game date. The game number and the last two characters of the game date are added to GN to name the file in which the data for the game is kept. The game number can go as high as 9999 and still leave enough room to make a valid file name. Once this data is entered, the file is opened and the data recorded. The program then moves to the entry of the actual player performance data.

The player data entry section uses the abbreviated name strings found when the program was started. These appear on the screen one by one along with prompts for the individual data items. The first prompt you see asks if this player played in this game. A "yes" answer moves you on through the prompts in a normal manner for data entry. A "no" answer enters a zero value for all data and calculation items and moves you on to the next player. Now on to data prompts.

The first prompt is AT BATS (not OFFICIAL AT BATS). The program uses it as plate appearances and makes corrections to it for the calculations. The next prompt, RUNS, tells how many times a player has scored, while HITS (in our league), records a hit anytime a runner gets on base without a walk. (See the end of this section to find out how to account for errors and fielders choice entries.) The remaining prompts are WALKS, followed by DOUBLES, TRIPLES, HOMERS and SACS (sacrifice flies). They are self-explanatory. RBI records the runs batted in, while TIMES ENDED INNING is a source of curiosity. We keep this statistic because errors and fielders' choices are ignored in our league.

That completes the entered data items. The final three statistics are calculated items: the batting, on base and slugging average.

Since we don't keep any data on errors and fielders' choices, none of these calculations take them into account. The batting average is the number of hits divided by the quantity derived from subtracting the number of walks and number of sacrifices from the number of plate appearances. The on-base average is the number of hits plus number of walks divided by the number of plate appearances minus number of sacrifices. The slugging average is the average number of bases gained per hit, calculated by adding the number of hits, doubles, twice the number of triples, and three times the number of homers together and dividing the result by the number of hits. This yields a slugging average between one and four.

That completes the statistics items for an individual player. At this point the player's abbreviated name string, indicating whether a player played in the game, and a string composed of the individual statistics is written into the game file. The program then updates the total stats string in the roster file and restores it there, then goes on to the next player. The program keeps a count of the players and automatically exits the entry section when it runs out of them.

Occasionally while entering data, the program seems to hang up. However, it is just cleaning up its string-handling overhead and will be back momentarily.

Now let's talk about keeping track of errors and fielders' choices for those of you who are more serious than we are. The easiest way to keep track of them is to combine them into one data item (for example, E&FC) and to substitute that item for the ended innings (EI) item. It is then a simple matter to edit the calculations on lines 1190 to 1210 and 1330 to 1350 to reflect their use if desired. Of course you can keep track of them without using them in your calculations. This way your averages seem higher too.

Another way to keep track of errors and fielders' choices is to keep them as separate data items. This is more difficult unless you don't mind wasting half a sector on each roster file entry by using it to store three bytes.

The roster file is set up to use 128 bytes for each record, or half of a sector. To maintain this and add the necessary variables, I suggest using the ended innings variable for one and create another by snatching three bytes from the name and address fields. This increases the number of statistics kept on each player from thirteen to fourteen. You must reDIMension those arrays that include the statistics entries.

Then go to lines 1190 to 1210 and lines 1330 to 1350 and alter the calculations to your satisfaction. Lines 1220 to 1290 and lines 1360 to 1430 must be reworked to concatenate all the data items into a single string. Don't forget to edit the FIELD statements on lines 1075 and 6020 and on Line 520 of RSTRMKR.

I chose to assemble the individual stats into one long string for the disk files because I dreaded the idea of thirteen separate CVN statements, followed by 17 separate LSET statements, to build the file. As it turned out, it probably would have been easier.

This completes the discussion of the game entry module of FUNSTATS. The rest of the program is much simpler and straightforward.

The second FUNSTATS module is the game or totals display reached by selecting 2 from the main menu. When selected, the screen is cleared and you are prompted to choose whether you want to see a game file, the totals-to-date, or return to the main menu. If you choose to view a game, you are then prompted to enter a game number. The proper game file is then read into the computer and the statistics displayed, player by player, on the screen in a format very similar to the input screen.

If you choose to view the totals-to-date, the screen is cleared and you are prompted to enter the date. Entering the date is optional and you may simply press ENTER. The statistics are then displayed, player by player, on the screen, again in a format similar to the input screen. Finally, if you choose the main menu, it is whisked back onto the screen.

The third FUNSTATS module is the report-printing routine, reached by selecting 3 from the main menu. When selected, the screen is cleared and you are prompted to choose a game report, a statistics-to-date report, a roster listing, or to return to the main menu. If you choose to print a game report, the screen is cleared and you are prompted for a game number. The entered game number is then checked in memory and if not there, the proper game file is read into the computer. You are then prompted to make sure the printer is on and the paper positioned. The report is headed by the game number, the home team and visiting team's score, and the date the game was played. Then a label header is printed, followed by the individual players' abbreviated name strings and statistics entries.

If you choose to print a statistics-to-date report, the screen is cleared and you are prompted for a date. The date is optional but highly recommended. You are then prompted to check that the printer is on and paper positioned. The report is labeled as a totals report and the rest printed in the same format as the game report. Our team had thirteen players, and I found it possible to put two game reports and a totals report on one page.

When printing a roster listing, the screen is cleared and you are prompted again to check the printer and paper. A simple listing of the name, address and phone number of each player is then printed. When you are finished, choose the main menu.

The fourth and final section of `FUNSTATS` is the roster review module, reached by selecting 4 from the main menu. When selected, the screen is cleared and `ROSTER LISTING` is printed at the top of the screen. Then the name, address and phone number of each player is printed to the screen, three players at a time. The module automatically returns to the main menu when out of players.

Two other modules to `FUNSTATS` are subroutines called by the program that can't be accessed from the menu. The first opens and reads in a game file and passes the statistics string. The second opens and reads in the roster file and is called by the program before a menu selection can be made.

For those who have a 16K system and might want to break `FUNSTATS` into separate programs, be sure to include the proper file-input subroutines with the modules that require them.

Accessory Programs

Perhaps I missed something, but I couldn't get Disk BASIC to perform a single-drive copy operation. So I wrote `COPYFILE` for when I am working in Disk BASIC. If you are using JDOS don't bother to use the `COPYFILE` program.

As mentioned already, if you made any changes in the `DIM`ension statements, the file-naming methods, or the roster file fields in the other programs, also make those changes in this program.

When running `COPYFILE`, you are first prompted to copy a roster file, game file or to quit. When you choose to copy a roster or game file, you are then prompted for the necessary file identification and the file is read into memory. The program assumes that the source disk is the one in the drive. You are then prompted to place the destination disk in the drive, and the file is written to it. When the write operation is done, you are sent back to the initial prompt.

Now we come to `RSTRFXR` (*RoSTeR-FiXeR*). If you keep a backup disk or never make mistakes while entering a game file, you won't need to use this program. Again, if you made any changes to the previous programs, you need to repeat them for this program.

> ***"Games are identified solely by their number, and the program is configured to accomodate a season consisting of consecutively numbered games."***

The program first prompts for the season, then reads in the roster file and finds the abbreviated name strings. It prompts for a starting and ending game number — if you are repairing a botched roster file, enter 1 for the starting game number, with the last game entered correctly as the ending game number. When preparing a special report, enter the number of the first game included in the report as the starting game number and the last game included in the report as the ending game number.

The program then reads in the respective game files and uses the data to construct a new total statistics array. As you may have concluded by now, games are identified solely by their number, and the program is configured to accomodate a season consisting of consecutively numbered games.

When the new totals have been calculated, you are prompted to save the new array as the roster file or a special file or to send it to the printer. To save it as the roster file, the array reconstructs the total statistics string and is stored to disk as the roster file. To save the data as a special file, you are prompted for a name of eight or less characters, and the total statistics strings are rebuilt from the array and stored on the disk in the roster file format, under the new file name. Essentially what you have created is another roster file covering a specified range of games.

If you choose to send the new data to the printer, a report is produced in approximately the same format as the `FUNSTATS` program. For both a printout and a disk file, there is the save to disk and the print option. To do more than one special report at a sitting, exit the program and start from `RUN` each time to keep from mixing up variables in memory.

This completes the `FUNSTATS` group of programs. Included are the following two short programs to aid those typing in the listing. You may find them useful in the debugging stages. They are `GMFLCHK` (Listing 4) and `CLRRSTR` (Listing 5) or *GaMe-FiLeCHecK* and *CLeaRRoSTeR*. Use `GMFLCHK` to look at the contents of the game files directly. Use `CLRRSTR` to reset the total statistics strings of the roster file to contain nothing but zeroes, as it does when `RSTRMKR` is used.

The printer I used with these programs is a TRS-80 DMP 100 with minimal special features and generic control codes, so the printer routines should work as is with any other Tandy dot-matrix printer. If you have a different printer, you may need to rework the printer routines.

Other Notes

The roster file is a direct (or random) access file that is named using `F1$`; it uses Buffer 2. The roster file records are each 128 bytes long and contain five fields. The first field is the name field `NF$` and is 25 bytes; the second is address field `AF$` and is 30 bytes; the third, city field `CF$` at 20 bytes; the fourth, phone field `PF$` at eight bytes; and the fifth is statistics field `SF$` at 45 bytes.

The game files are sequential, named using `F$` and Buffer 1. Since they are sequential, the records have no specific length. At the start of each game file is the game number `GN$`, the name of the other team `OT$`, and one-byte string `HT$` containing a yes or no answer to the question "Are we the home team?"

`R1$` and `R2$` contain, respectively, the home and visiting team's score followed by the game's date, `D$`. These initial entries are followed by an entry for each player consisting of three strings. The first of the three is the abbreviated name string `N2$`; the second, a one-byte string that answers the question "Played in this game?"; and the third, the 45-byte statistics string. So after the initial strings are stored, the rest of the file is composed of these three, repeated for each player in the roster.

If you need to reenter a game file without affecting the roster file, you can use `FUNSTATS` with a slight modification. Do this by loading `FUNSTATS` and add the lines: `1301 NEXT K` and `1302 CLOSE`, then press ENTER. Be sure to delete these lines or to reload the program before proceeding with normal use.

You may have noticed that once a special report file is stored on disk using RSTRFXR, there is no provision for reopening and printing it out again. To do that, use FUNSTATS. *First, note the* file name from the disk, then load FUNSTATS and add the line: 6005 F1$="*filename*", using the filename from the disk. Run the program, select the print module, and select the statistics-to-date report. At the date prompt, you may enter a note other than the date, such as a tournament name. Check the printer, position the paper, and press ENTER. Remember to delete the extra line before going on to other functions.

One final note to CoCo 3 users: I wrote this program using a CoCo 1, expanded to 64K. I upgraded to a CoCo 3 and had trouble getting the program to work, but after many frustrating hours, found that the string manipulations were overwriting some of the higher line numbers of the program. To get around this, enter PCLEAR1 before loading the program. Also, if you find you are being dumped with an Out of String Space Error message, try adjusting the amount of memory reserved by the CLEAR statement.

(Questions or comments concerning this project may be addressed to the author at 4780 SE Christopher Ave., Albany, OR 97321. Please include an SASE when requesting a reply.) ☐

✓

330	85	3010	88
1070	117	3130	50
1200	75	3210	23
1300	142	4070	73
1420	222	5130	127
2050	234	END	160
2210	240		

Listing 1: FUNSTATS

```
0 ' COPYRIGHT 1989  FALSOFT,INC
100 REM FUNSTATS
110 REM SOFTBALL STATS PROGRAM
120 REM DELBERT BAKER COPYRIGHT
1987
130 REM 32K ECB COCO 1
140 REM RSDOS 1.0 OR JDOS 1.11
150 REM
160 CLEAR 5000
170 DIM N$(20), A$(20)
180 DIM C$(20), P$(20)
190 DIM ST$(20), GS$(20)
200 DIM SU$(13), SA$(13)
210 DIM N2$(20), PL$(20)
220 DIM S$(20,13), T$(20,13)
230 DIM S(20,13), T(20,13)
240 DIM U(13)
270 CLS:LINE INPUT"SEASON (YY):
";Y$
280 Y$=RIGHT$(Y$,2):F1$="ROSTER"
+Y$
290 GOSUB 6000
300 CLS:PRINT:PRINT@47,"MENU":PR
INT
310 PRINT"1.  ENTER A GAME":PRIN
T
320 PRINT"2.  DISPLAY A GAME OR
TOTALS":PRINT
330 PRINT"3.  PRINT A REPORT":PR
INT
340 PRINT"4.  REVIEW ROSTER":PRI
NT
350 PRINT"5.  QUIT":PRINT
360 PRINT@452,"WHICH ONE";:INPUT
 B
370 IF B<1 OR B>5 THEN 360
380 IF B=5 THEN 410
390 ON B GOSUB 1000,2000,3000,40
00
400 GOTO 300
410 CLOSE:END
999 REM NEW GAME DATA ENTRY MODU
LE
1000 CLS:PRINT:LINE INPUT"GAME N
UMBER? ";GN$
1010 PRINT:LINE INPUT"OPPOSING T
EAM? ";OT$
1020 PRINT:LINE INPUT"ARE WE THE
 HOME TEAM?(Y/N)  ";HT$
1030 PRINT:LINE INPUT"WHAT DID W
E SCORE? ";R1$
1040 PRINT:LINE INPUT"WHAT DID T
HEY SCORE? ";R2$
1050 PRINT:LINE INPUT"GAME DATE
(MM/DD/YY): ";D$
1060 PRINT:F$="GM"+GN$+RIGHT$(D$
,2)
1070 OPEN"O",#1,F$:OPEN"D",#2,F1
$,128
1075 FIELD#2,25 AS NF$,30 AS AF$
,20 AS CF$,8 AS PF$,45 AS SF$
1080 IF HT$="N" THEN 1090 ELSE T
1$="BUFFALOES":HS$=R1$:T2$=OT$:V
S$=R2$:GOTO1100
1090 T1$=OT$:HS$=R2$:T2$="BUFFAL
OES":VS$=R1$
1100 CLS:PRINT"GAME NO. ";GN$:PR
INT"HOME ";T1$;"   ";HS$
1110 PRINT"VISITORS ";T2$;"  ";
VS$:PRINT"PLAYED ";D$
1115 WRITE #1, GN$,OT$,HT$,R1$,R
2$,D$
1120 FOR K=1 TO R
1130 CLS:PRINT N2$(K):LINE INPUT
"PLAYED IN THIS GAME(Y/N)? ";PL$
1135 IF LEFT$(PL$,1)="N" THEN 14
80 ELSE 1140
1140 INPUT"AT BATS";U(1):INPUT"R
UNS";U(2)
1150 INPUT"HITS";U(3):INPUT"WALK
S";U(4)
1160 INPUT"DOUBLES";U(5):INPUT"T
RIPLES";U(6)
1170 INPUT"HOMERS";U(7):INPUT"SA
CS";U(8)
```

```
1180 INPUT"RBI'S";U(9):INPUT"TIM
ES ENDED INNING";U(10)
1190 IF (U(1)-U(4)-U(8))=0 THEN
U(11)=0 ELSE U(11)=U(3)/(U(1)-U(
4)-U(8))
1200 IF (U(1)-U(8))=0 THEN U(12)
=0 ELSE U(12)=(U(3)+U(4))/(U(1)-
U(8))
1210 IF U(3)=0 THEN U(13)=1 ELSE
U(13)=(U(3)+U(5)+2*U(6)+3*U(7))/
U(3)
1220 FOR Y=1 TO 10:SA$(Y)=STR$(U
(Y)):NEXT Y
1230 FOR Y=1 TO 10:L=LEN(SA$(Y))
:SA$(Y)="00"+RIGHT$(SA$(Y),L-1):
NEXT Y
1240 FOR Y=1 TO 10:SA$(Y)=RIGHT$
(SA$(Y),3):NEXT Y
1250 FOR Y=11 TO 13:SA$(Y)=STR$(
1000*U(Y)+.5):NEXT Y
1260 IF U(11)=1 THEN SA$(11)="1.
000" ELSE IF U(11)=0 THEN SA$(11
)="0.000" ELSE SA$(11)="0."+MID$
(SA$(11),2,3)
1270 IF U(12)=1 THEN SA$(12)="1.
000" ELSE IF U(12)=0 THEN SA$(12
)="0.000" ELSE SA$(12)="0."+MID$
(SA$(12),2,3)
1280 SA$(13)=MID$(SA$(13),2,1)+"
."+MID$(SA$(13),3,3)
1290 GS$(K)="":FOR Y=1 TO 13:GS$
(K)=GS$(K)+SA$(Y):S(K,Y)=U(Y):NE
XT Y
1300 WRITE #1,N2$(K),PL$,GS$(K)
1305 REM NOW PARSE THE ROSTER FI
LE STATS AND UPDATE
1320 FOR Y=1 TO 10:T(K,Y)=T(K,Y)
+U(Y):NEXT Y
1330 IF (T(K,1)-T(K,4)-T(K,8))=0
 THEN T(K,11)=0 ELSE T(K,11)=T(K
,3)/(T(K,1)-T(K,4)-T(K,8))
1340 IF (T(K,1)-T(K,8))=0 THEN T
(K,12)=0 ELSE T(K,12)=(T(K,3)+T(
K,4))/(T(K,1)-T(K,8))
1350 IF T(K,3)=0 THEN T(K,13)=1
ELSE T(K,13)=(T(K,3)+T(K,5)+2*T(
K,6)+3*T(K,7))/T(K,3):T(K,13)=IN
T(1000*T(K,13)+.5)/1000
1360 FOR Y=1 TO 10:SU$(Y)=STR$(T
(K,Y)):NEXT Y
1370 FOR Y=1 TO 10:L=LEN(SU$(Y))
:SU$(Y)="00"+RIGHT$(SU$(Y),L-1):
NEXT Y
1380 FOR Y=1 TO 10:SU$(Y)=RIGHT$
(SU$(Y),3):NEXT Y
1390 FOR Y=11 TO 13:SU$(Y)=STR$(
1000*T(K,Y)+.5):NEXT Y
1400 IF T(K,11)=1 THEN SU$(11)="
1.000" ELSE IF T(K,11)=0 THEN SU
$(11)="0.000" ELSE SU$(11)="0."+
MID$(SU$(11),2,3)
1410 IF T(K,12)=1 THEN SU$(12)="
1.000" ELSE IF T(K,12)=0 THEN SU
$(12)="0.000" ELSE SU$(12)="0."+
MID$(SU$(12),2,3)
1420 SU$(13)=MID$(SU$(13),2,1)+"
."+MID$(SU$(13),3,3)
1430 ST$(K)="":FOR Y=1 TO 13:ST$
(K)=ST$(K)+SU$(Y):NEXT Y
1440 LSET NF$=N$(K):LSET AF$=A$(
K):LSET CF$=C$(K):LSET PF$=P$(K)
:LSET SF$=ST$(K)
1450 PUT #2,K
1460 NEXT K
1470 G=R:CLOSE:RETURN
1480 GS$(K)=STRING$(45,48)
1490 FOR X=1 TO 13:S(K,X)=0:NEXT
 X
1500 WRITE #1,N2$(K),PL$,GS$(K)
1510 GOTO 1460
1999 REM GAME OR TOTALS DISPLAY
2000 CLS:PRINT"DISPLAY A <G>AME
OR <T>OTALS TO DATE OR GOTO THE
<M>AIN MENU.";
2010 B$=INKEY$:IF B$="G" THEN 20
20 ELSE IF B$="T" THEN 2190 ELSE
 IF B$="M" THEN RETURN ELSE 2010
2020 CLS:LINE INPUT"GAME NO. ";G
A$
2030 IF GA$=GN$ THEN 2040 ELSE G
```

Nine-Times

The bi-monthly magazine on disk
especially for your CoCo 3 with OS-9 Level 2!

- **10 programs with each issue to build your OS-9 library!**
- **Instruction and examples of Basic09 procedures to help with your own programs.**
- **Program Reviews, Hints, and Help columns to advance your knowledge of OS-9.**
- **Supplied totally on 5.25" disk**

For only $34.95, you get all 60 programs and valuable articles for a whole year!

Send U.S. check or
money order to:
JWT Enterprises
5755 Lockwood Blvd.
Youngstown, Ohio 44512
Sorry, no C.O.D.'s

Prices:
1-Year $34.95
Back Issues $7.00 ea

Canada, add $1.00
Foreign, add $2.00

```
N$=GA$: GOSUB 5010
2040 CLS:PRINT@0,"GAME NO.: ";GN
$:PRINT@16,"PLAYED: ";D$
2050 PRINT@32,"HOME: ";T1$;"-";H
S$
2060 PRINT@64,"VISITOR: ";T2$;"-
";VS$
2070 PRINT@96,STRING$(32,"-"):X=
G
2080 FOR K=1 TO X
2090 PRINT@128,N2$(K)
2100 PRINT@192,"AT BATS: ";S(K,1
):PRINT@208,"RUNS: ";S(K,2)
2110 PRINT@224,"HITS: ";S(K,3):P
RINT@240,"WALKS: ";S(K,4)
2120 PRINT@256,"DOUBLES: ";S(K,5
):PRINT@272,"TRIPLES: ";S(K,6)
2130 PRINT@288,"HOMERS: ";S(K,7)
:PRINT@304,"SACS: ";S(K,8)
2140 PRINT@320,"RBI'S: ";S(K,9):
PRINT@336,"END INN: ";S(K,10)
2150 PRINT@352,"BAT AV: ";:PRINT
USING"#.###";S(K,11):PRINT@368,"
 ON BS AV: ";:PRINTUSING"#.###";S
(K,12)
2160 PRINT@384,"SLUG AV: ";:PRIN
TUSING"#.###";S(K,13)
2170 PRINT@448,"PRESS ANY KEY TO
 CONTINUE";:B$=INKEY$:IF B$="" T
HEN 2170
2180 NEXT K:GOTO 2000
2190 CLS:LINE INPUT"TODAY'S DATE
: ";TD$
2200 CLS:PRINT@32,"TOTAL STATS A
S OF ";TD$
2210 PRINT@96,STRING$(32,"-"):X=
R
2220 FOR K=1 TO X
2230 PRINT@128,N2$(K)
2240 PRINT@192,"AT BATS: ";T(K,1
):PRINT@208,"RUNS: ";T(K,2)
2250 PRINT@224,"HITS: ";T(K,3):P
RINT@240,"WALKS: ";T(K,4)
2260 PRINT@256,"DOUBLES: ";T(K,5
):PRINT@272,"TRIPLES: ";T(K,6)
2270 PRINT@288,"HOMERS: ";T(K,7)
:PRINT@304,"SACS: ";T(K,8)
2280 PRINT@320,"RBI'S: ";T(K,9):
PRINT@336,"END INN: ";T(K,10)
2290 PRINT@352,"BAT AV: ";:PRINT
USING"#.###";T(K,11):PRINT@368,"
 ON BS AV: ";:PRINTUSING"#.###";T
(K,12)
2300 PRINT@384,"SLUG AV: ";:PRIN
TUSING"#.###";T(K,13)
2310 PRINT@448,"PRESS ANY KEY TO
 CONTINUE";:B$=INKEY$:IF B$="" T
HEN 2310
2320 NEXT K:GOTO 2000
2999 REM REPORT PRINTING ROUTINE
3000 CLS:PRINT:PRINT"<G>AME REPO
RT"
3010 PRINT:PRINT"<S>TATS TO DATE
 REPORT"
3020 PRINT:PRINT"<R>OSTER LISTIN
G"
3030 PRINT:PRINT"<M>AIN MENU":PR
INT:PRINT
3040 B$=INKEY$:IF B$="" THEN 304
0
3050 IF B$="G" THEN 3060 ELSE IF
 B$="S" THEN 3160 ELSE IF B$="R"
 THEN 3220 ELSE IF B$="M" THEN R
ETURN ELSE 3040
3060 CLS:LINE INPUT"GAME NO. ";G
A$
3070 IF GA$=GN$ THEN 3090 ELSE G
N$=GA$
3080 GOSUB 5010
3085 REM GAME REPORT
3090 INPUT"PRINTER ON? PAPER POS
ITIONED?   PRESS <ENTER> WHEN RE
ADY";B$
3100 PRINT#-2,"GAME NO. ";GN$;"
 ";"HOME ";T1$;"--"HS$;"  ";"VIS
ITORS ";T2$;"--";VS$;"  ";"PLAYE
D ";D$:PRINT#-2
3110 X=G
3120 PRINT#-2,CHR$(10);CHR$(15);
TAB(4)"NAME";TAB(20)"  AB   R
H  BB  2B  3B  HR SAC RBI  EI
BA    OBA    SLA";CHR$(14);CHR$(1
0)
3130 FOR K=1 TO G
3140 PRINT#-2,N2$(K);TAB(20)S(K,
1);TAB(24)S(K,2);TAB(28)S(K,3);T
AB(32)S(K,4);TAB(36)S(K,5);TAB(4
0)S(K,6);TAB(44)S(K,7);TAB(48)S(
K,8);TAB(52)S(K,9);TAB(56)S(K,10
);TAB(60)S(K,11);TAB(67)S(K,12);
TAB(73)S(K,13)
3150 NEXT K:GOTO 3000
3160 CLS:LINE INPUT"TODAY'S DATE
: ";TD$
3165 INPUT"PRINTER ON? PAPER POS
ITIONED?   PRESS <ENTER> WHEN RE
ADY.";B$
3170 PRINT#-2,CHR$(10);TAB(24);C
HR$(15);"STATISTICS REPORT AS OF
 ";TD$;CHR$(14);CHR$(10)
3180 PRINT#-2,CHR$(10);CHR$(15);
TAB(4)"NAME";TAB(20)"  AB  R   H
   BB  2B  3B  HR SAC RBI  EI
BA    OBA    SLA";CHR$(14);CHR$(1
0)
3190 FOR K=1 TO R
3200 PRINT#-2,N2$(K);TAB(19)T(K,
1);TAB(23)T(K,2);TAB(27)T(K,3);T
AB(31)T(K,4);TAB(35)T(K,5);TAB(3
9)T(K,6);TAB(43)T(K,7);TAB(47)T(
K,8);TAB(51)T(K,9);TAB(55)T(K,10
);TAB(59)T(K,11);TAB(64)T(K,12);
```

```
TAB(72)T(K,13)
3210 NEXT K:GOTO 3000
3215 REM MAKE A HARDCOPY OF THE
ROSTER
3220 CLS:INPUT"PRINTER ON? PAPER
 POSITIONED?   PRESS <ENTER> WHE
N READY.";B$
3230 PRINT#-2,CHR$(31);TAB(17)CH
R$(15);"ROSTER";CHR$(14);CHR$(30
);CHR$(10)
3240 FOR K=1 TO R
3250 FOR X=1 TO 10:IF RIGHT$(N$(
K),1)<>" " THEN 3260 ELSE N$(K)=
LEFT$(N$(K),LEN(N$(K))-1):NEXT X
3260 FOR X=1 TO 10:IF RIGHT$(A$(
K),1)<>" " THEN 3270 ELSE A$(K)=
LEFT$(A$(K),LEN(A$(K))-1):NEXTX
3270 PRINT#-2,N$(K);TAB(22)A$(K)
;TAB(46)C$(K);TAB(66)P$(K)
3280 NEXT K:GOTO 3000
3999 REM ROSTER REVIEW
4000 CLS:PRINT TAB(13)"ROSTER LI
STING":Y=1
4010 PRINT"PRESS ANY KEY TO CONT
INUE";
4020 B$=INKEY$:IF B$="" THEN 402
0
4030 CLS:FOR K=Y TO Y+2
4040 PRINTN$(K):PRINTA$(K):PRINT
C$(K);TAB(23)P$(K):PRINT
4050 IF K=R THEN 4080 ELSE 4060
4060 NEXT K
4070 Y=Y+3:GOTO 4010
4080 PRINT@481,"THAT'S ALL--PRES
S ANY KEY";
4090 B$=INKEY$:IF B$="" THEN 409
0 ELSE RETURN
4999 REM INPUT A GAME FILE
5000 CLS:LINE INPUT"GAME NO.: ";
GN$
5010 F$="GM"+GN$+Y$
5020 OPEN "I",#1,F$
5030 INPUT #1,GN$,OT$,HT$,R1$,R2
$,D$
5040 IF HT$="N" THEN 5050 ELSE T
1$="BUFFALOES":HS$=R1$:T2$=OT$:V
S$=R2$:GOTO 5060
5050 T1$=OT$:HS$=R2$:T2$="BUFFAL
OES":VS$=R1$
5060 G=0
5070 IF EOF(1)=-1 THEN 5100
5080 G=G+1:INPUT #1,N2$(G),PL$(G
),GS$(G)
5090 GOTO 5070
5095 REM NOW PARSE THE STAT STRI
NG
5100 FOR K=1 TO G
5110 FOR Y=1 TO 10:S$(K,Y)=MID$(
GS$(K),3*Y-2,3):NEXT Y
5120 Z=31:FOR Y=11 TO 13:S$(K,Y)
=MID$(GS$(K),Z,5):Z=Z+5:NEXT Y
5130 FOR Y=1 TO 13:S(K,Y)=VAL(S$
(K,Y)):NEXT Y
5140 NEXT K
5150 CLOSE #1:RETURN
5999 REM INPUT THE ROSTER FILE A
ND FIND N2$
6000 CLS:PRINT"READING THE ROSTE
R FILE."
6010 OPEN "D",#2,F1$,128:R=LOF(2
)
6020 FIELD #2,25 AS NF$,30 AS AF
$,20 AS CF$,8 AS PF$,45 AS SF$
6030 FOR K=1 TO R
6040 GET #2,K
6050 N$(K)=NF$:A$(K)=AF$:C$(K)=C
F$:P$(K)=PF$:ST$(K)=SF$
6060 NEXT K
6065 REM PARSE THE STAT STRING
6070 PRINT"PARSING THE STAT STRI
NG":FOR K=1 TO R
6080 FOR Y=1 TO 10:T$(K,Y)=MID$(
ST$(K),3*Y-2,3):NEXT Y
6090 Z=31:FOR Y=11 TO 13:T$(K,Y)
=MID$(ST$(K),Z,5):Z=Z+5:NEXT Y
6100 FOR Y=1 TO 13:T(K,Y)=VAL(T$
(K,Y)):NEXT Y
6110 NEXT K
6115 REM FIND N2$
6120 PRINT"FINDING THE 2ND NAME
STRINGS":Q$=","
6130 FOR K=1 TO R:M=INSTR(1,N$(K
),Q$)+1
6140 N2$(K)=LEFT$(N$(K),M)
6150 NEXT K
6160 CLOSE #2:RETURN
```

Listing 2: RSTRMKR

```
0 ' COPYRIGHT 1989  FALSOFT,INC
100 REM ROSTERMAKER
110 REM DELBERT BAKER COPYRIGHT
1987
120 REM SET UP A NEW ROSTER FILE
130 CLEAR 5000
140 DIM N$(20), A$(20)
150 DIM C$(20), P$(20)
160 C1$="Albany, OR 97321":C2$="
Corvallis, OR 97330"
170 CLS:PRINT@9,"NEW ROSTER FILE
":PRINT
180 INPUT"WHAT SEASON IS THIS";Y
$:PRINT
190 F1$="ROSTER"+RIGHT$(Y$,2)
200 X=1:CLS:PRINT@4,"ENTER PLAYE
R INFORMATION"
210 LINE INPUT"LAST NAME: ";NA$
```

```
220 IF NA$="STOP" THEN 300
230 LINE INPUT"FIRST NAME: ";NB$
240 N$(X)=NA$+","+NB$
250 LINE INPUT"ADDRESS: ";A$(X)
260 LINE INPUT"CITY, STATE ZIP
1  2  INPUT    :";C$(X)
270 IF C$(X)="1" THEN C$(X)=C1$
ELSE IF C$(X)="2" THEN C$(X)=C2$
 ELSE 280
280 LINE INPUT"PHONE NUMBER: ";P
$(X):PRINT
290 X=X+1:GOTO210
300 X=X-1:CLS:PRINT@12,"SORTING"
310 F=0
320 FOR Y=1 TO X-1
330 IF N$(Y)<=N$(Y+1) THEN 370 E
LSE 340
340 S1$=N$(Y):S2$=A$(Y):S3$=P$(Y
):S4$=C$(Y)
350 N$(Y)=N$(Y+1):A$(Y)=A$(Y+1):
P$(Y)=P$(Y+1):C$(Y)=C$(Y+1)
360 N$(Y+1)=S1$:A$(Y+1)=S2$:P$(Y
+1)=S3$:C$(Y+1)=S4$:F=1
370 NEXT Y
380 IF F<>0 THEN 310 ELSE 390
390 PRINT"SORTING DONE.":PRINT
400 PRINT"<S>CREEN OR <D>ISK OR
<Q>UIT"
410 PRINT:PRINT"PRESS <S> OR <D>
 OR <Q>"
420 B$=INKEY$:IF B$="S" THEN 430
 ELSE IF B$="D" THEN 510 ELSE IF
 B$="Q" THEN END ELSE 420
430 Y=1
440 PRINT"PRESS ANY KEY TO CONTI
NUE.";
450 B$=INKEY$:IF B$="" THEN 450
460 CLS:FOR K=Y TO Y+2
470 PRINT N$(K):PRINT A$(K):PRIN
T C$(K);TAB(20)P$(K):PRINT
480 IF K=X THEN 400 ELSE 490
490 NEXT K
500 Y=Y+3:GOTO 440
510 OPEN"D",#2,F1$,128:SB$=STRIN
G$(45,"0")
520 FIELD #2,25 AS NF$,30 AS AF$
,20 AS CF$,8 AS PF$,45 AS SF$
530 FOR K=1 TO X
540 LSET NF$=N$(K): LSET AF$=A$(
K):LSET CF$=C$(K):LSET PF$=P$(K)
:LSET SF$=SB$
550 PUT #2,K:NEXT K
560 CLOSE 2:PRINT"ROSTER STORED
AS ";F1$: GOTO 400
```

Listing 3: RSTRFXR

```
0 ' COPYRIGHT 1989  FALSOFT,INC
100 REM ROSTERFIXER (RSTRFXR)
110 REM RECALCULATION OF THE TOT
AL STAT STRING
120 REM COPYRIGHT 1987 DELBERT B
AKER
130 REM 32K ECB COCO 1
140 REM
150 CLEAR 5000
160 DIM N$(20),A$(20)
170 DIM C$(20),P$(20)
180 DIM ST$(20),GS$(20)
190 DIM SU$(13),SA$(13)
200 DIM N2$(20),PL$(20)
210 DIM S$(20,13),T$(20,13)
220 DIM S(20,13),T(20,13)
230 DIM U(13)
240 CLS:LINE INPUT"SEASON (YY):
";Y$
250 Y$=RIGHT$(Y$,2):F1$="ROSTER"
+Y$
260 OPEN"D",#2,F1$,128:R=LOF(2)
270 FIELD #2,25 AS NF$,30 AS AF$
,20 AS CF$,8 AS PF$,45 AS SF$
280 FOR K=1 TO R
290 GET#2,K
300 N$(K)=NF$:A$(K)=AF$:C$(K)=CF
$:P$(K)=PF$:FOR Y=1 TO 13:T(K,Y)
=0:NEXT Y
310 NEXT K:CLOSE #2
320 PRINT"FINDING THE 2ND NAME S
TRING":Q$=","
330 FOR K=1 TO R:M=INSTR(1,N$(K)
,Q$)+1
340 N2$=LEFT$(N$(K),M)
350 NEXT K
360 CLS:PRINT"    THIS PROGRAM I
S TO PREPARE  SPECIAL REPORTS AN
D TO REPAIR A BOTCHED STAT STRIN
G IN A ROSTER FILE."
370 PRINT"ENTER A RANGE OF GAME
NUMBERS ATTHE PROMPTS.":PRINT
380 LINE INPUT"START AT GAME NO.
: ";SG$:PRINT
390 LINE INPUT"END AT GAME NO.:
";EG$:PRINT
400 PRINT"PLACE THE GAME DATA DI
SK IN THE DRIVE."
410 LINE INPUT"PRESS <ENTER> WHE
N READY.";B$
420 SG=VAL(SG$):EG=VAL(EG$)
430 FOR X=SG TO EG
440 GN$=STR$(X):L=LEN(GN$):GN$=R
IGHT$(GN$,L-1)
450 F$="GM"+GN$+Y$
460 OPEN"I",#1,F$
470 INPUT #1,GN$,OT$,HT$,R1$,R2$
,D$
```

GAME POINT SOFTWARE

This Month's Feature

NEW For CoCo 3

Z'89

by Steve Bjork

A hostile space fortress has been spotted at the outer edge of our galaxy. Destroy this menacing battle platform by navigating your spacecraft with the utmost skill to scale walls; dodge force fields; blow up fuel tanks; dog fight defense ships; evade comets and ultimately disable the powerful robot overlord!

Six years after this arcade hit was first released on the Color Computer 1, world renown software author Steve Bjork brings one of his most popular and most requested games to the Color Computer 3 market.

Z'89 puts your flying skills to the ultimate test in this 100% M/L game featuring 5 Mega-Bytes of Super-Res Graphics and Digital sound! At last, a program that actually out shines the original arcade version!!! Requires a Color Computer 3 128K disk system.

REG. $29.95 Introductory Special $24.95!

DONUT DILEMMA

NEW For CoCo 1, 2

by Nickolas Marentes

Angry Angelo has raided Antonio's Donut Factory sending the entire complex amuck! Donuts have come alive and are jumping around in wild frenzies. Machines have gone out of control throwing cooking fat, dough and icing sugar everywhere! You must help poor Antonio climb ladders, Jump platforms and ride elevators to reach the top floor and shut down the factory's power generator which will restore law and order.

Disk. . .$19.95

WE NOW ACCEPT. . . MasterCard VISA DISCOVER AMERICAN EXPRESS

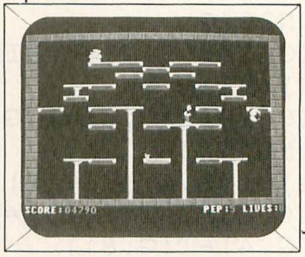
ALL PROGRAMS REQUIRE A COLOR COMPUTER 3 DISK OR TAPE SYSTEM (unless indicated).

Personal checks, money orders, and American C.O.D. orders accepted. Include $3.00 for S/H. $2.50 extra for C.O.D. orders. (Cal. res. add 6.5 % tax.)

ATTENTION PROGRAMMERS: Game Point Software is looking for talented writers. Top royalties guaranteed.

Rupert Rythym

by Nickolas Marentes



Help Rupert infiltrate ''Music Box Records'' and collect all of his stolen notes which are scattered throughout the complex. Ride the crazy elevators and beware of the security robots on patrol.

This strategy arcade game features 17 different, 16 color graphic screens and some of the hottest digitized percussion music and vocals you've ever heard. Disk or Tape. . .$24.95

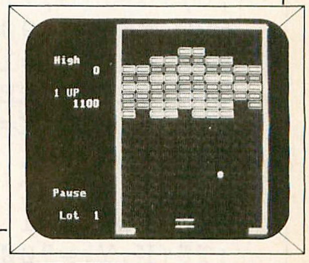
NEW For CoCo 1, 2, 3

baSh

by Steve Bjork

Based on a popular arcade game which we can't mention (But sounds like ''Art Gannoyed''). BASH challenges you to clear the screen by ''BASHING'' your ball through multiple brick layers. Of course you'll have help getting through this 20 level game by activating options like, Slow Ball, Expanded Paddle, Multi-Ball, and more!

$24.95

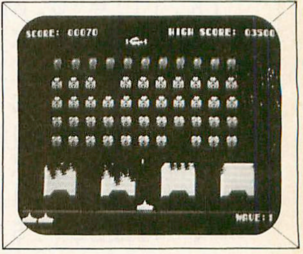


SPACE INTRUDERS

by Nickolas Marentes

Enemy alien creatures have been identified entering our solar system, their destination: our home planet! Their goal: the total annihilation of our race. They must not be allowed to land!

An action arcade game featuring high quality 16 color graphics and sound effects. $24.95

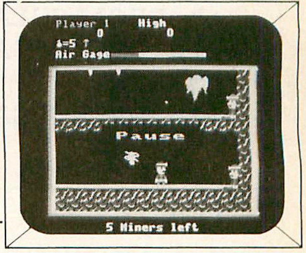


MINE RESCUE

by Steve Bjork

A terrible mine disaster has just occured and it will be up to you and your talents to enter the mine, jump the pits, avoid the spikes, fight off the bats and other creepy crawlers and get air to the needy victims. Mine rescue features over 2 mega-bytes of arcade-style graphics, real time music and multiple mine levels. Hours of fun!

$24.95



WARP FIGHTER 3-D

by Steve Bjork

$24.95 (Extra Glasses $2.95)

GAME POINT SOFTWARE

P.O. Box 6907, Burbank, CA 91510-6907
(818) 566-3571 • BBS: (818) 772-8890
Toll Free: 800 877-2232 Ext. 139

```
480 G=0:CLS:PRINT"WORKING ON GAM
E";X
490 IF EOF(1)=-1 THEN 580
500 G=G+1:INPUT#1,N2$(G),PL$(G),
GS$(G):PRINT N2$(G)
510 FOR Y=1 TO 10:S$(G,Y)=MID$(G
S$(G),3*Y-2,3):NEXT Y
530 FOR Z=1 TO 10:T(G,Z)=T(G,Z)+
VAL(S$(G,Z)):NEXT Z
540 IF (T(G,1)-T(G,4)-T(G,8))=0
THEN T(G,11)=0 ELSE T(G,11)=T(G,
3)/(T(G,1)-T(G,4)-T(G,8))
550 IF (T(G,1)-T(G,8))=0 THEN T(
G,12)=0 ELSE T(G,12)=(T(G,3)+T(G
,4))/(T(G,1)-T(G,8))
560 IF T(G,3)=0 THEN T(G,13)=1 E
LSE T(G,13)=(T(G,3)+T(G,5)+2*T(G
,6)+3*T(G,7))/T(G,3)
570 GOTO 490
580 CLOSE #1:NEXT X
590 PRINT"REBUILDING THE STAT ST
RING":FOR K=1 TO R
600 FOR Y=1 TO 10:T$(K,Y)=STR$(T
(K,Y)):NEXT Y
610 FOR Y=1 TO 10:L=LEN(T$(K,Y))
:T$(K,Y)="00"+RIGHT$(T$(K,Y),L-1
):NEXT Y
620 FOR Y=11 TO 13:T$(K,Y)=STR$(
1000*T(K,Y)+.5):NEXT Y
630 IF T(K,11)=1 THEN T$(K,11)="
1.000" ELSE IF T(K,11)=0 THEN T$
(K,11)="0.000" ELSE T$(K,11)="0.
"+MID$(T$(K,11),2,3)
640 IF T(K,12)=1 THEN T$(K,12)="
1.000" ELSE IF T(K,12)=0 THEN T$
(K,12)="0.000" ELSE T$(K,12)="0.
"+MID$(T$(K,12),2,3)
650 T$(K,13)=MID$(T$(K,13),2,1)+
"."+MID$(T$(K,13),3,3)
660 FOR Y=1 TO 10:T$(K,Y)=RIGHT$
(T$(K,Y),3):NEXT Y
670 ST$(K)="":FOR Y=1 TO 13:ST$(
K)=ST$(K)+T$(K,Y):NEXT Y
680 NEXT K
700 CLS:PRINT"GAMES";SG;" TO";EG
;" RECALCULATED.":PRINT
710 PRINT"SAVE TO <R>OSTER FILE.
":PRINT
720 PRINT"SAVE TO <S>PECIAL FILE
.":PRINT
730 PRINT"SEND TO <P>RINTER.":PR
INT
740 PRINT"<Q>UIT":PRINT
750 PRINT"<R>, <S>, <P>, OR <Q>:
 ";
760 A$=INKEY$:IF A$="R" THEN 780
 ELSE IF A$="S" THEN 770 ELSE IF
 A$="P" THEN 850 ELSE IF A$="Q"
THEN 940 ELSE 760
770 CLS:LINE INPUT"INPUT SPECIAL
 FILE NAME (8 OR   LESS CHARACTE
RS):";F1$:IF LEN(F1$)>8 THEN 770
780 REM GOSUB 900
790 OPEN"D",#2,F1$,128
800 FIELD#2,25 AS NF$,30 AS AF$,
20 AS CF$,8 AS PF$,45 AS SF$
810 FOR X=1 TO R
820 LSET NF$=N$(X):LSET AF$=A$(X
):LSET CF$=C$(X):LSET PF$=P$(X):
LSET SF$=ST$(X)
830 PUT#2,X:NEXT X
840 CLOSE #2:PRINT"FILE STORED A
S ";F1$:GOTO 710
850 CLS:PRINT"PRINTER ON? PAPER
POSITIONED?"
860 PRINT"PRESS <ENTER> WHEN REA
DY.":INPUT B$
870 PRINT#-2,TAB(21)"SPECIAL REP
ORT FROM GAME";SG;" TO";EG
880 PRINT#-2,CHR$(10);CHR$(15);T
AB(4)"NAME";TAB(20)"  AB  R   H
  BB  2B  3B  HR SAC RBI  EI   B
A   OBA   SLA";CHR$(14);CHR$(10)
890 FOR K=1 TO R
900 PRINT#-2,N2$(K);TAB(19)T(K,1
);TAB(23)T(K,2);TAB(27)T(K,3);TA
B(31)T(K,4);TAB(35)T(K,5);TAB(39
)T(K,6);TAB(43)T(K,7);TAB(47)T(K
,8);TAB(51)T(K,9);TAB(55)T(K,10)
;TAB(59)INT(1000*T(K,11)+.5)/100
0;TAB(64)INT(1000*T(K,12)+.5)/10
00;
901 PRINT#-2,TAB(72)INT(1000*T(K
,13)+.5)/1000
910 NEXT K
920 GOTO 700
930 REM A$=INKEY$:IF A$="" THEN
810 ELSE IF A$="Q" THEN 820 ELSE
 240
940 CLOSE:END
```

Listing 4: GMFLCHK

```
0 ' COPYRIGHT 1989  FALSOFT,INC
5 CLS:INPUT"GAME NO.";Z$
7 F$="GM"+Z$+"87"
10 OPEN"I",#1,F$
20 INPUT#1,GN$,OT$,HT$,R1$,R2$,D
$
30 PRINT GN$,OT$,HT$,R1$,R2$,D$
40 IF EOF(1)=-1 THEN END
50 INPUT#1,N2$,PL$,GS$
60 PRINT N2$,PL$,GS$
70 A$=INKEY$
80 IF A$="" THEN 70 ELSE 40
90 END
```

Listing 5: CLRRSTR

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 OPEN"D",#2,"ROSTER87",128
20 FIELD#2,25 AS NF$,30 AS AF$,2
0 AS CF$,8 AS PF$,45 AS SF$
30 R=LOF(2):SB$=STRING$(45,"0")
40 FOR X=1 TO R
50 GET #2,X
60 N$=NF$:ST$=SF$
70 PRINT N$:PRINT ST$
80 PRINT"CLEAR THIS ONE? (Y/N)"
90 A$=INKEY$
100 IF A$="N" THEN 130 ELSE IF A
$="Y" THEN 110 ELSE 90
110 LSET SF$=SB$
120 PUT #2,X
130 NEXT X
140 CLOSE:END
```

Listing 6: COPYFILE

```
0 ' COPYRIGHT 1989  FALSOFT,INC
100 CLEAR5000
110 DIM N$(20),A$(20)
120 DIM C$(20),P$(20)
130 DIM ST$(20),N2$(20)
140 DIM PL$(20),GS$(20)
150 CLS:PRINT:PRINT"COPY <R>OSTE
R FILE,":PRINT
160 PRINT"COPY <G>AME FILE,":PRI
NT
170 PRINT"OR <Q>UIT.":PRINT
180 PRINT"R,G, OR Q?:";
190 A$=INKEY$:IF A$="R" THEN 200
 ELSE IF A$="G" THEN390 ELSE IF
A$="Q" THEN 560 ELSE 190
200 CLS:LINEINPUT"SEASON (YY): "
;Y$
210 PRINT:PRINT"COPYING ROSTER F
ILE FOR THE ";Y$;" SEASON"
220 F1$="ROSTER"+RIGHT$(Y$,2)
230 OPEN "D",#2,F1$,128:R=LOF(2)
240 FIELD #2,25 AS NF$,30 AS AF$
,20 AS CF$,8 AS PF$,45 AS SF$
250 FOR K=1 TO R
260 GET#2,K
270 N$(K)=NF$:A$(K)=AF$:C$(K)=CF
$:P$(K)=PF$:SP$(K)=SF$
280 NEXT K
290 CLOSE #2
300 PRINT"PLACE THE DESTINATION
DISK IN THE DRIVE.  PRESS <ENTER
>.";
310 INPUT Z
320 OPEN "D",#2,F1$,128
330 FIELD #2,25 AS NF$,30 AS AF$
,20 AS CF$,8 AS PF$,45 AS SF$
340 FOR K=1 TO R
350 LSET NF$=N$(K):LSET AF$=A$(K
):LSET CF$=C$(K):LSET PF$=P$(K):
LSET SF$=SP$(K)
360 PUT #2,K
370 NEXT K
380 CLOSE #2:PRINT"ROSTER COPIED
":FOR X=1 TO 500:NEXTX:GOTO150
390 CLS:LINEINPUT"SEASON (YY): "
;Y$:PRINT
400 LINEINPUT "GAME NUMBER: ";GN
$
410 F$="GM"+GN$+Y$
420 OPEN "I",#1,F$
430 INPUT #1,GN$,OT$,HT$,R1$,R2$
,D$
440 G=0
450 IF EOF(1)=-1 THEN480
460 G=G+1:INPUT #1,N2$(G),PL$(G)
,GS$(G)
470 GOTO 450
480 CLOSE #1:PRINT"PLACE THE DES
TINATION DISK IN THE DRIVE.  PRE
SS <ENTER>."
490 INPUT Z
500 OPEN "O", #1,F$
510 WRITE #1,GN$,OT$,HT$,R1$,R2$
,D$
520 FOR K=1 TO G
530 WRITE #1,N2$(K),PL$(K),GS$(K
)
540 NEXT K
550 CLOSE #1:PRINT"GAME FILE COP
IED.":FOR X=1 TO 500:NEXTX:GOTO1
50
560 END
```

A wildcard utility for those hard-to-find disk files

Selective Directory Listings Using Wildcards

By Richard Estrado

Have you ever had to strain your eyes looking through a long directory listing for one hard-to-pin-down program? Or search through a large batch of disks for one file or group of files? Or even worse, try to find a file whose filename you just can't remember: Well, *Wildcard* may be just the help you need.

Wildcard is a utility that enhances the `DIR` command of the CoCo 2 or 3, enabling it to display selective directory listings using wildcards. It requires a Tandy Color Computer 2 or 3 with Extended Disk BASIC versions 1.1 or 2.1, at least 64K of RAM and one disk drive.

Here's how *Wildcard* works:

1) The `DIR` command can be used as usual with either a drive number following it or not. `DIR` or `DIR1` etc. . .

2) The user can enter a filename only according to BASIC's standard syntax for entering filenames. `DIR "FILE.EXT"` or `DIR "FILE/EXT:1"`

3) The user can use one wildcard in either the filename or extension. The character used for the wildcard is the asterisk (*). `DIR "FILE.*"` or `DIR "FI*.BAS"`

In the above examples, all characters in the filename or extension occurring from the point of the wildcard are disregarded by the search routines in *Wildcard*. The result in Example 1 is

Listing 1: `WILDBIN`

```
                    00010 * WILDCARDS
                    00020 *
                    00025 * COPYRIGHT 1989  FALSOFT,INC
                    00026 *
5030B               00027         ORG     $503B
503B 4F             00030 START   CLRA
503C 8E   5042      00040         LDX     #WILD   LOAD ADDR OF WILD IN X
503F BF   C1F1      00050         STX     $C1F1   STORE IN JUMP TABLE ENTRY
5042 A6   9F 00A6   00060 WILD    LDA     [$A6]   CHAR CURRENTLY BEING PROCESSED
5046 81   22        00070         CMPA    #'"     IS IT (") ?
5048 27   03        00080         BEQ     GTFN    IF SO THEN GET FILE NAME
504A 16   7C5C      00090         LBRA    $CCA9   ELSE RETURN TO OLD DIR
504D 17   78E5      00100 GTFN    LBSR    $C935   GET FILE NAME ECT.
5050 B6   094C      00110         LDA     $094C   GET FIRST CHAR OF FNAME
5053 BB   0954      00120         ADDA    $0954   ADD FIRST CHAR OF EXT
5056 81   54        00130         CMPA    #84     IS IT "*.*" ?
5058 1027 7C4D      00140         LBEQ    $CCA9   IF SO THEN GOTO OLD DIR
                    00150 *
                    00160 *  SET UP DSKON PARAMETERS
                    00170 *
505C BD   C79D      00180         JSR     $C79D   MAKE SURE FAT IS VALID
505F BD   B958      00190         JSR     $B958   PRINT CARRIGE RETURN
5062 CC   1102      00200         LDD     #$1102  *
5065 97   EC        00210         STA     $00EC   *
5067 D7   EA        00220         STB     $EA     *
5069 C6   03        00230         LDB     #3      *  SET UP DSKCON PARMS
506B D7   ED        00240 STORE   STB     $ED     *
506D 8E   0600      00250         LDX     #$600   * POINT X TO DISK BUFFER
5070 9F   EE        00260         STX     $EE     *
5072 BD   D6F2      00270         JSR     $D6F2   READ A SECTOR
5075 1F   13        00280 COMP    TFR     X,U     COPY X POINTER TO U
5077 A6   84        00290         LDA     ,X      LOAD FIRST CHAR OF DIRECTORY
5079 27   45        00300         BEQ     ADVAN   IF 0 THEN ADVANCE POINTER
507B 43             00310         COMA            CHECK END OF DIRECTORY; $FF
507C 1027 009A      00320         LBEQ    END     IF IT IS, THEN END
                    00330 *
                    00340 * COMPARE FILE NAME
                    00350 *
5080 108E 094C      00360 SERCH1  LDY     #$094C  POINT Y TO START OF FILENAME
5084 A6   A4        00370 COMP1   LDA     ,Y      LOAD CHAR OF FILENAME IN ACCA
5086 81   2A        00380         CMPA    #'*     IS IT AN ASTERISK?
5088 1027 000F      00390         LBEQ    SERCH2  IF SO, GO SEARCH THE EXTENSION
508C A1   C0        00400         CMPA    ,U+     COMPRE WITH DATA IN I/O BUFFER
508E 26   30        00410         BNE     ADVAN   IF MISMATCH THEN AVANCE
5090 108C 0953      00420         CMPY    #$953   CHECK FOR END OF FILENAME
5094 27   05        00430         BEQ     SERCH2  IF AT END, START EXT SEARCH
5096 31   21        00440         LEAY    1,Y     INCREMENT FILENAME POINTER
5098 7E   5084      00450         JMP     COMP1   LOOP TO COMP1
509B 30   08        00460 SERCH2  LEAX    8,X     SET X POINTER TO EXT
509D 1F   13        00470         TFR     X,U     COPY THIS VALUE TO U
```

Richard Estrado has studied and taught Computer Science for the past four years at Fatima College, Trinidad.

```
509F 108E 0954    00480          LDY     #$954   POINT Y TO EXTENSION
50A3 A6   A4      00490 COMP2    LDA     ,Y      LOAD CHAR OF EXT IN ACCA
50A5 81   2A      00500          CMPA    #'*     IS IT AN ASTERISK?
50A7 1027 0023    00510          LBEQ    DUMP    IF SO THEN DUMP DIR ENTRY
50AB A1   C0      00520          CMPA    ,U+     COMPARE CHAR IN I/O BUFFER
50AD 27   04      00530          BEQ     COMP3   IF MATCH THEN GOTO COMP3
50AF 30   18      00540          LEAX    -8,X    ELSE RESET X POINTER
50B1 20   0D      00550          BRA     ADVAN   AND ADVANCE TO NEXT DIR ENTRY
50B3 108C 0956    00560 COMP3    CMPY    #$956   CHECK FOR END OF EXT
50B7 26   02      00570          BNE     NEXT    IF IT'S NOT THEN GOTO NEXT
50B9 20   13      00580          BRA     DUMP    ELSE DUMP DIR ENTRY
50BB 31   21      00590 NEXT     LEAY    1,Y     INCREMENT EXT CHAR POINTER
50BD 7E   50A3    00600          JMP     COMP2   LOOP TO COMP2
                  00610 *
                  00620 * ADVANCE THE DIRECTORY POINTER
                  00630 *
50C0 30   88 20   00640 ADVAN    LEAX    32,X    INC. MAIN BUFFER POINTER
50C3 8C   0700    00650          CMPX    #$700   ARE WE AT END OF BUFFER?
50C6 26   AD      00660          BNE     COMP    IF NOT THEN LOOP TO COMP
50C8 5C           00670          INCB            INCREMENT SECTOR POINTER
50C9 C1   0B      00680          CMPB    #11     CHECK WITH MAX SECTOR NO#
50CB 23   9E      00690          BLS     STORE   IF >11 THEN GOTO STORE
50CD 39           00700          RTS             IF AT END,RETURN TO BASIC
                  00710 *
                  00720 * DUMP THE DIRECTORY LINE
                  00730 *
50CE 30   18      00740 DUMP     LEAX    -8,X    RE-ADJUST X POINTER
50D0 35   40      00750          PULS    U       SAVE TOP OF STACK
50D2 BD   A549    00760          JSR     $A549   GO DO A BREAK CHECK
50D5 34   40      00770          PSHS    U       RESTORE STACK
50D7 34   04      00780          PSHS    B       SAVE B;SECTOR POINTER
50D9 34   10      00790          PSHS    X       SAVE X;I/O BUFFER POINTER
50DB C6   08      00800          LDB     #8      *
50DD BD   B9A2    00810          JSR     $B9A2   *
50E0 BD   CD1B    00820          JSR     $CD1B   *
50E3 C6   03      00830          LDB     #3      *
50E5 BD   B9A2    00840          JSR     $B9A2   *
50E8 BD   CD1B    00850          JSR     $CD1B   *
50EB E6   00      00860          LDB     0,X     * THIS SECTION OF CODE
50ED C1   0A      00870          CMPB    #10     * SIMPLY DUMPS THE DIRECTORY
50EF 1024 0003    00880          LBCC    CLEAR   * ENTRY WHICH HAS PASSED THE
50F3 17   7C25    00890          LBSR    $CD1B   * COMPARISON CHECKS ABOVE
50F6 4F           00900 CLEAR    CLRA            *
50F7 BD   BDCC    00910          JSR     $BDCC   *
50FA 17   7C1E    00920          LBSR    $CD1B   *
50FD AE   E4      00930          LDX     ,S      *
50FF 86   42      00940          LDA     #$42    *
5101 AB   0C      00950          ADDA    12,X    *
5103 17   7C12    00960          LBSR    $CD18   *
5106 E6   0D      00970          LDB     13,X    *
5108 17   7C13    00980          LBSR    $CD1E   *
510B 1F   89      00990          TFR     A,B     *
510D 4F           01000          CLRA            *
510E BD   BDCC    01010          JSR     $BDCC   *
5111 BD   B958    01020          JSR     $B958   *
5114 35   10      01030          PULS    X       RESTORE X
5116 35   04      01040          PULS    B       RESTORE B
5118 20   A6      01050          BRA     ADVAN   GO ADVANCE POINTER
511A 39           01060 END      RTS             RETURN TO BASIC
          0000    01070          END

00000 TOTAL ERRORS
```

that all files with a name of `FILE` and any extension is listed. In Example 2, all files with the first two characters `FI` and an extention of `BAS` are listed.

4) The user can specify two wildcards in one filename, but if the filename is `*.*`, all files are listed. Also keep in mind that if the filename is `*.*`, the drive number in the filename is ignored.

Type in the assembly language code (Listing 1) given in *EDTASM+* and assemble it. After a successful assembly (no errors), exit from the assembler. At the BASIC prompt type the following line:

```
SAVEM"WILD",20539,20762,20539
```

The trailing numbers in the above line are decimal equivalents to the locations of the labels `END` and `START` in the source code. To use it, just enter `LOADM "WILD":EXEC20539`.

You can alternatively type in the BASIC program and save it with this line: `SAVE"WILD"`.

After running the program, control is automatically transferred to the routine from the old `DIR` command. Therefore it is not necessary to type `EXEC` every time you wish to use the wildcard feature.

One important point for CoCo 2 users is to put the machine into all-RAM mode before running the program. Since the CoCo 3 is always in this mode, it does not require that step. Joseph Forgionie's `ALLRAM` program ("Prompt Attention," July '87, Page 97) puts the CoCo into an all-RAM mode. The program is found in Listing 3.

(Questions or comments about the program may be directed to the author at 43 Sapphire Crescent, Diamond Vale, Diego Martin, Trinidad, West Indies. Please include an SASE if requesting a reply.) ☐

THE BEST COCO ASSEMBLY LANGUAGE PROGRAMMING BOOKS IN PRINT

"Assembly Language Programming for the CoCo" (The Book) and the CoCo 3 (The Addendum). Professionally produced (not just skimpy technical specifications). THE CoCo reference books.

THE BOOK - 289 pages of teaching assembly language for the CoCo 1 & 2. It's used as a school text and is an intro to Computer Science. It describes the 6809E instructions, subroutines, interrupts, stacks, programming philosophy, and many examples. Also covered are PIAs, VDG, SAM, kybd, jystk, sound, serial port, and using cassette and disk. $18.00 + $1.50 s/h.

THE ADDENDUM - Picks up where the BOOK left off. Describes ALL the CoCo 3 enhancements & how to use them with assembly language. The most complete GIME spec. WOW - Super-Res Graphics, Virtual Memory, New Interrupts, and more information not available elsewhere. Find out what the CoCo 3 can really do. $12.00 + $1.00 s/h.

COCO 3 SPECIAL Start your CoCo library right. See what the CoCo can really do and save money - buy the BOOK and ADDENDUM for only $27.00 + $2.00 s/h.

US check or money order. RI orders add 6% sales tax

TEPCO
68 James Court
Portsmouth, RI 02871

See Us On DELPHI

Listing 2: `WILDBAS`

```
10 '**********************
20 '* WILDCARD UTILITY   *
30 '* By Richard Estrado *
40 '*                    *
46 '* RUN THE PROGRAM    *
50 '* IN "ALL RAM" MODE  *
70 '**********************
80 'COPYRIGHT 1989  FALSOFT,INC
90 DATA 79,142,80,66,191,193,241
,166,159,0,166,129,34,39,3,22,12
4,92,23,120,229,182,9,76,187,9,8
4,129,84,16,39,124,77,189,199,15
7,189,185,88,204,17,2,151,236
100 DATA 215,234,198,3,215,237,1
42,6,0,159,238,189,214,242,31,19
,166,132,39,69,67,16,39,0,154,16
,142,9,76,166,164,129,42,16,39,0
,15,161,192,38,48,16,140,9,83,39
,5,49
110 DATA 33,126,80,132,48,8,31,1
9,16,142,9,84,166,164,129,42,16,
39,0,35,161,192,39,4,48,24,32,13
,16,140,9,86,38,2,32,19,49,33,12
6,80
120 DATA 163,48,136,32,140,7,0,3
8,173,92,193,11,35,158,57,48,24,
53,64,189,165,73,52,64,52,4,52,1
6,198,8,189,185,162,189,205,27,1
98,3,189,185,162,189,205,27
130 DATA 230,0,193,10,16,36,0,3,
23,124,37,79,189,189,204,23,124,
30,174,228,134,66,171,12,23,124,
18,230,13,23,124,19,31,137,79,18
9,189,204,189,185,88,53,16,53,4,
32,166,57
140 '
150 FOR X=20539 TO 20762
160 :  READ I
170 :  POKE X,I
180 NEXT X
190 EXEC 20539
200 END
```

Listing 3: `ALLRAM`

```
10 ' THIS PROGRAM WILL PUT THE
20 ' COCO 2 INTO ALL RAM MODE
30 '
40 DATA 26,80,142,128,0,127,255,
222,166,132,127,255,223,167,132,
48,1,140,255,0,38,239,28,159,57
50 FOR A=&HE00 TO &HE18
60 :  READ X
70 :  POKE A,X
80 NEXT
90 EXEC&HE00:POKE 65503,0
100 END
```

SPECIAL DEAL ON 500 PROGRAMS IS BACK!

BACK BY POPULAR DEMAND! GET OUR LATEST 50 DISKS OR TAPES FULL OF OVER 500 PROGRAMS. HERE IS WHAT YOU'LL RECEIVE:

★Over 250 Utility/Home Application Programs including a Word Processor, Database, Spreadsheet, Disk Utilities, Business Software, Electronics Series, Educational Programs for Kids, plus much more!

★Over 200 exciting games including King Pede, Kron, Star Trek, Flight Simulator, Wizard, Horse Races, Football, plus much more.

★Over 30 adventures including Rambo, Haunted House, Power Sword, Skid Row, plus 32k graphic adventures.

Individual issues sell for $9⁰⁰ each or $450⁰⁰ for all 50. We slashed the price to only $150⁰⁰!

REG. $450 NOW $150⁰⁰

TURN TO PAGES 106 & 107 FOR A COMPLETE LISTING OF ALL OUR PROGRAMS.

★★THIS MONTH ONLY★★

Buy this package of 500 programs and receive a free 6 month subscription.

RAINBOW CERTIFICATION SEAL

BEST

WE'VE CHOSEN THE BEST OF OVER 760 PROGRAMS (OVER 6 YEARS OF ACCUMULATING FINE SOFTWARE), AND PACKAGED THEM FOR YOU. 12 PROGRAMS EACH PACKAGE. COLOR COMPUTER I, II or III. SPECIFY TAPE OR DISK. ONLY **$29.95 EACH PACKAGE!** 5 NEW ONES!

#1 Home Mgmt I
- Budget
- Checkbook Balancer
- Cost of Living
- Tinycalc Spreadsheet
- Electronic Datebook
- Account Manager
- Stock Market
- Word Processor
- Lottery Analyst
- Coco Database
- Coco Terminal
- Bartender

#4 Business Helper DISK ONLY
- Workmate
- Word Processor
- Spreadsheet
- Calendar
- Accounts Receivable
- Accounts Payable
- Income Property
- Mail List
- Small Business Helper
- Stock Charting
- Job Log
- Asset Manager

#7 Machine Lang. Tut.
- Basic Compiler
- ML Tutorial Pt. 1
- ML Tutorial Pt. 2
- ML Tutorial Pt. 3A, 3B
- ML Tutorial Pt. 4
- ML Tutorial Pt. 5
- ML Tutorial Pt. 6
- ML Tutorial Pt. 7
- ML Tutorial Pt. 8
- MLT Dictionary
- Coco Technical Look
- Coco Technical Look Pts. 1-3

#2 Education
- Flash Card
- Spanish Lessons
- Typing Tutor
- Creativity Test
- Arith. Football
- Cost of Living
- Math Tutors 1, 2
- Trigonometry Tutor
- Typing Game
- Word Tests
- Talking Alphabet
- Clown Dunk Math

#5 Games III 'NEW'
- Sandy Rover
- Gray Lady
- Flippy The Seal
- Abie Builders
- Panzer
- Mrs. Pac
- Fire Runner
- Cosmic Rays
- Dig
- Battle Tank
- Kron
- King Pede

#8 Gamble Issue 'NEW'
- Horse Racing
- Rack Track
- Black Jack
- Slot Machine
- Lottery Analyst
- Coco Keeno
- Lucky Money
- Betting Pool
- Baccarat
- Draw Poker
- Turtle Races
- Hi-Lo/Craps

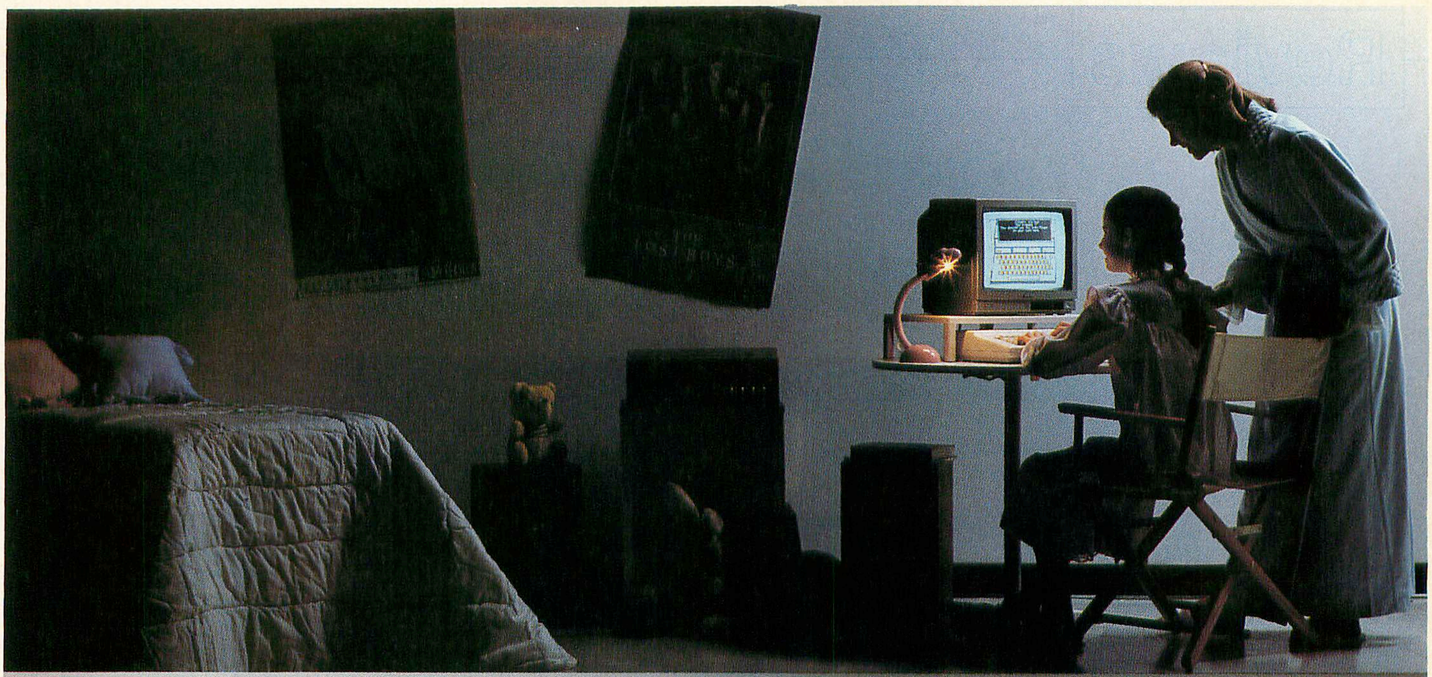
#3 Adventures II 'NEW'
- Dungeon Master
- Hired, Tired, Fired
- Iceworld
- Jungle
- Keys
- Amulet of Power
- The Trip
- Cookies
- Barracks
- Genesis Project
- Rambo
- Zigma Experiment

#6 Electronics Tutorial 'NEW'
- Electronics 1 + 2
- Electronics 3 + 4
- Electronics 5 + 6
- Electronics 7 + 8
- Electronics 9 + 10
- Electronics 11 + 12
- Electronics 13
- Electronics 14
- Electronics 15
- Electronics 16
- Electronics 17
- Electronics 18

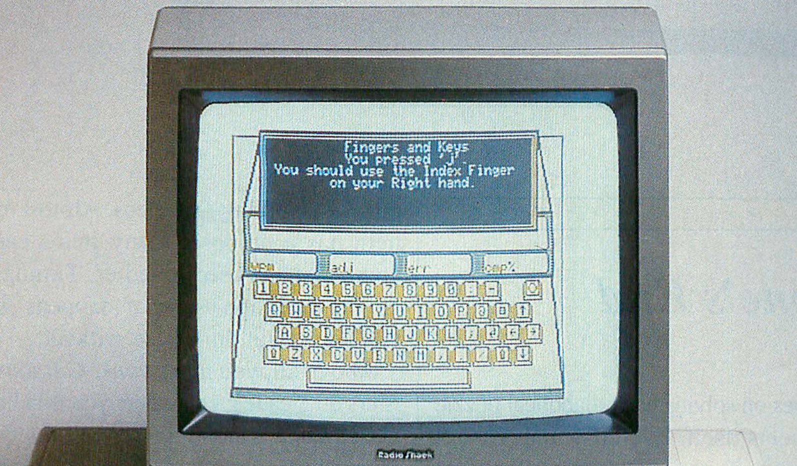
#9 Coco 3 Only 'NEW'
- Paint Coco 3
- Convert Coco 3
- Demon's Castle
- Function Keys
- Bowling 3
- Coco 3 ⬧ Coco 2
- Wizard
- Coco 3 Drawer
- H-Res Chess
- FYR-Draca 3
- Whammy 3
- Coco 3 Screen Print

$29⁹⁵ EACH SET ★ Special This Month ★ Buy 2 Packages and get 1 FREE

T & D SUBSCRIPTION SOFTWARE, 2490 MILES STANDISH DR., HOLLAND, MI 49424 (616) 399-9648



Give your kids a head start with the affordable, expandable Tandy® Color Computer 3®



Why buy a TV game when you can have a powerful computer instead? Just connect the Tandy Color Computer 3 to your TV for an extraordinarily low-priced home computer system.

With the educational software available for the Color Computer 3, your children can study math, reading, typing—a variety of subjects—all while learning how to use a *real* computer.

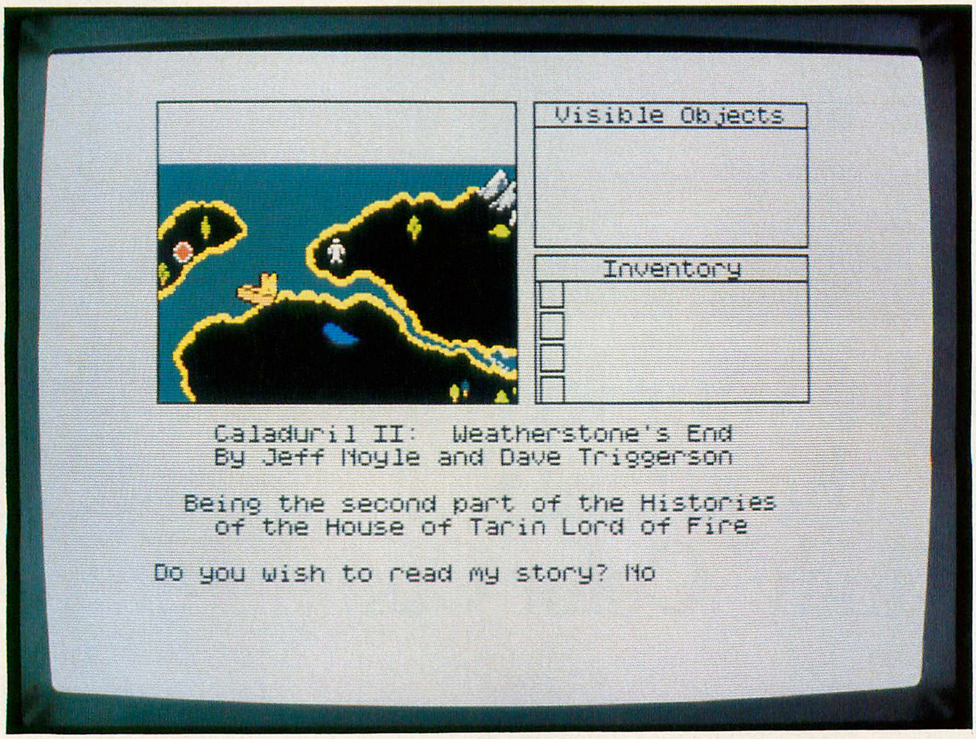
The Color Computer 3 provides impressive computing power for grownups, too. There's a library of useful software available. Choose from word processing, spreadsheet and database programs, *in addition to* games the whole family can enjoy.

Expand anytime with a printer, disk drives, a telephone modem and more. Add a CM-8 high-resolution monitor to create colorful, razor-sharp graphics.

The Color Computer 3 offers uncompromising performance at a terrific price—see it today.

Radio Shack®

The Technology Store™
A DIVISION OF TANDY CORPORATION



```
Caladuril II:  Weatherstone's End
By Jeff Noyle and Dave Triggerson

Being the second part of the Histories
of the House of Tarin Lord of Fire

Do you wish to read my story? No
```

Software CoCo 3

Caladuril II— Weatherstone's End

Passing on the Torch

If you've negotiated other role-playing, puzzle-solving games and think you have seen it all, this one's for you. In order to successfully finish *Caladuril II — Weatherstone's End*, you must have the crafty inventiveness of Leonardo da Vinci, the guile of an aborigine tracker, the mind of Rube Goldberg and the patience of Job.

This is not a difficult game. It is a ring-tailed, solid-gold near-impossibility. The "Scoreboard Pointers" department in RAINBOW can expect a flood of letters begging for advice and hints. The question is: Will there be anybody out there with answers? Those who know some of them can justifiably chortle with glee and congratulate themselves on solving each diabolical puzzle that presents itself. Even if you never get to the game's end, there are plenty of obstacles you can be proud of solving.

The scenario seems standard: Olin, son of Jamerend, has been sent by the sages to recover the legendary Weatherstone on Lord's Isle. To do that, he must somehow overcome shipwreck, negotiate maze-like architecture, solve complicated puzzles and defeat the awesome power of Silmnoleh before returning the Weatherstone to its rightful place so that the disastrous weather can be stopped. Variation on a theme? Perhaps, but what makes *Caladuril II* so different are the absolutely sly and devious puzzles. Nothing is useless. Almost every item has a purpose; many items can be combined and used together. Timing and paying attention to what happens when you do certain things are critical.

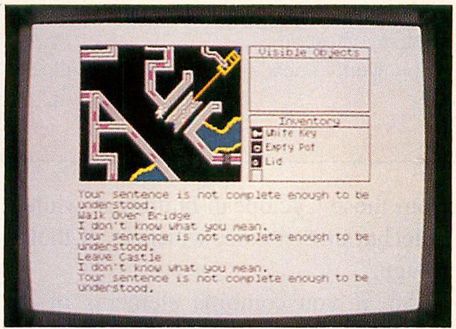
Above all, you must *think! Caladuril II* is not an arcade game where you mindlessly blast away at swarming enemies. It requires exercising every last ounce of creative brainpower you have. Even though not mentioned in the instructions, this could be an excellent game for two people to work on, either together or separately. As time passes (days or weeks), new ideas will suddenly arrive — maybe at inopportune moments when you can't immediately charge into your computer room and try them — which may, repeat *may*, be the answer to the one situation you've been mentally screaming about for so long.

The game comes on two disks for the CoCo 3. You can back up the Play disk but not the Boot disk. There is a one-year warranty, however. The instructions advise you to put a write-protect tab on the original Play disk before using the backup procedure. This is especially good advice if you're using one drive.

There is one slight catch. Due to certain proprietary routines, the game will not use the advanced features of a disk operating system such as *ADOS 3* or a Disk BASIC-compatible hard disk DOS. Apparently it will still play on those systems but won't use their advanced capabilities. This doesn't strike me as a big problem.

If you mess up, there is a game-save option that I recommend you exercise often. Since the system allows only one game-save per Play disk, I recommend you make several Play disks. One really great feature is the "Concede" command. This allows you to return to the nearest non-critical point in the game in case you messed up big time, thus avoiding having to go all the way back to the beginning if you fall into the lava.

The instruction booklet also includes a short history of the Fall of Tarin, the events that led to today's current situation. Tolkien aficionados may note some close similarities in names (this lends to the overall atmosphere).



```
Your sentence is not complete enough to be
understood.
Walk Over Bridge
I don't know what you mean.
Your sentence is not complete enough to be
understood.
Leave Castle
I don't know what you mean.
Your sentence is not complete enough to be
understood.
```

The graphics are terrific, thanks to the 256-by-192, 16-color screens and the number of graphics tiles. At least you have some nice, clear pictures to look at while you're pulling out your hair trying to solve the latest mystery. In fact, they are some of the best graphics to be seen on a CoCo 3 with RGB monitor. (Take a look at the lightning as only one example.) An RGB monitor isn't absolutely necessary, of course, but it certainly adds to the viewing pleasure.

The playing screen is divided into four sections: (1) the Play Screen (in color), where you maneuver the little figure that is Olin; (2) the Visible Objects area, which explains exactly what you're seeing; (3) the Inventory and; (4) the Text and Command Area. At first it seems that the Play Screen could be larger, but after a few minutes you'll appreciate the other displays. Plus, the memory saved allows for much more involved scenery and more exotic objects.

You move Olin about by means of the arrow keys. By using two at once you can move him at various angles, which is itself a bit of a challenge, to keep him from bumping into things. There are some very tight spaces in the tunnels.

Between moves, you type commands onto the screen, using one of the nearly 70 available verbs. All you have to do is figure out which ones work. There are instructions on how to tie two verbs together, using special linking words, but patience is a definite virtue while you're learning. Having a dictionary handy is probably a good idea.

Now for some hints and comments. The

The Two Behind the Triad

Oblique Triad, founded in March of 1987, was created to be a vehicle for owners/programmers Jeff Noyle and Dave Triggerson to write and play software of their own design. For their first offering, the game *Caladuril, Flame of Light,* the two left the marketing chores to another company. Now they are doing their own marketing, however, and have just come out with an exciting sequel to *Flame of Light, Caladuril II — Weatherstone's End.*

The game's concept, presentation format and actual programming was done by Jeff Noyle, who also designed the graphics and auxiliary items. Dave Triggerson worked out the disk I/O and translation of English commands into computerese.

Both partners are avid fantasy and science fiction fans, with somewhat differing tastes. However, they teamed together to produce quite an impressive computerized "alternative reality" package. Moreover, they've done their homework; when queried, they granted the similarity between the name *Caladuril* and *Galadriel*, stating that *Caladuril* is a combination of two Elvish words meaning "flame of light." (Before the really serious Tolkien students get upset about possible translation mistakes — don't fret about it. The combination serves the purpose well, and has a certain ring to it.)

Caladuril II is written entirely in machine code, using the double clock speed mode; 'Triad says that is the only way to get speed and smoothness on a CoCo 3. They also used 256-by-192, 16-color screens instead of 320-by-192 screens, which gives them some extra room on the Play disk to display certain objects up close when you look at them. It appears to me that they have used the CoCo 3's capabilities to the maximum possible while providing an enjoyable and intriguing game.

The company develops software exclusively for the CoCo. All current programs are for the CoCo 3, except one: *Caladuril, Flame of Light.* That one they've decided to rerelease, and it is written for any 64K CoCo 1, 2 or 3 with one drive. If demand is heavy enough, they might develop more programs for the CoCo 2, but they consider the CoCo 3 to be the future. Although the bulk of their business is through mail order, they have had a few visitors and certainly don't discourage customers who want to drop by instead of using the mail.

To the two programmers, packaging and accompanying "goodies" are very important. *Caladuril II* has a large map plus a pouch of real "Power Stones" to give you the feel of the game.

The future? Next out is *The Seventh Link,* a role-playing adventure with multiple characters, multiple worlds and 3-D dungeons. In addition to the three program disks,it includes a 30-page manual with illustrations, two double-sided maps, a quick reference card, a burnt and blackened copy of a "last" log entry and — a strip of simulated superconductor wire. Any other items, such as liquid nitrogen, are up to you as you immerse yourself in the story line.

A sound digitizer/editor called *Studio Works* is also in production; linked with that is a hardware analog-to-digital converter under development. And they expect to have a CoCo 3-D *M*rble M*dness* type of game ready for the October RAINBOWfest.

Jeff Noyle and Dave Triggerson spent three years, off and on, programming *Caladuril, Flame of Light.* When that was complete, they began work on *Caladuril II.* Their own interest plus requests from buyers of the original game prompted them to take on that task pretty much full-time.

The company name? Oblique Triad refers to the three slanted color bars on top of your CoCo. Go ahead, take a look; they're there, aren't they? The company's declared aim is "to produce software packages that are the pinnacle of quality in their category; the best the CoCo has seen."

They are off to a terrific start. ☐

A New Dimension in Alternate Realities

Manfred stood on the bridge's dark planks, his black bearskin battle uniform whipping in the cold wind shrieking through Skull Canyon. His heavy sword was already unsheathed and in his strong right hand. At the opposite end of the bridge, the foremost Plisn warrior stepped onto the scarred oak planking. "We meet again, demon-spawn," he shouted above the howling wind.

"We do indeed, Manfred of Arcsip." The foremost Plisn warrior, who had no name other than that given to him in fear by those he had defeated, smiled grimly through jagged teeth. "This time you will not escape me."

Manfred smiled in return. He had waited many planting seasons for this moment. He sensed a sharp-eyed presence: The archers of Karultee were concealed in the dark woods behind him, sturdy bowmen ready to send their thrumming arrows into the lightly-armored Plisn hordes as soon as he raised his sword. He knew also that the cavalry from the ringed fortresses in Wazoo would soon arrive, completing the elaborate trap he had so painstakingly calculated.

As he started to raise his sword, a blackboard filled with arcane, student-scribbled symbols appeared in his mind's eye. For an instant that froze time, he was once again Manfred Arthur Mueller, math teacher at Pasco High School. Then the image was gone, the wind had returned and he could sense bows bending as his sword rose higher.

Is this man suffering from a delusion or an inappropriate daydream? Nope, he's involved in what is now known as an "alternate reality." That's the latest term for fantasy or science fiction where the hero or heroine is suddenly transported to another place, perhaps another time. Theories of parallel universes existing in uneasy coexistence with ours become a strange sort of reality as the adventurers flip back and forth between worlds while trying to right some terrible wrong or accomplish some mission given to them — often against their protests — by forces they don't understand.

Why this current fascination with alternate realities? Some believe that it's the ultimate form of escapism, in which people of ordinary talents and moderate courage can identify with people of extraordinary talent and courage (who also have pure hearts and just causes) — and alleviate some of the pressures in their lives.

Reading this type of fiction allows us to believe that if things really got tough, each of us would be able to dredge up the courage and strength to defend our loved ones and defeat the "system."

Stephen King, in his book *Danse Macabre*, examined horror movies and theorized that the movies reflected the greatest fears of their respective decade: mutations caused by radiation, alien invaders, illegal medical experiments and so on. By extension, many of our current fears seem to huddle around the idea that individuals are being smothered and buried in "the system's" lack of caring about us. So, stories that tell us about people who fought "The Evil Ones" (or City Hall!) and won are encouraging even though they are basically illogical and ignore the fact that, as Frederick the Great of Prussia wrote, "God is always with the strongest battalions."

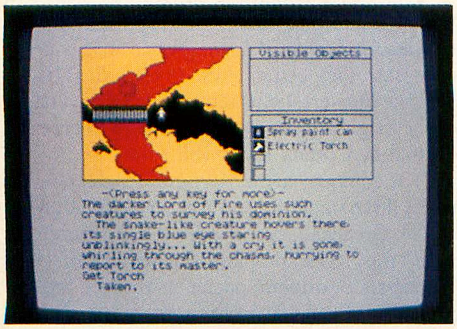
For those who want to get more closely involved in the process, there are computer programs that put you right in the middle of the whole mess. You have to solve various complex puzzles, accumulate what appears to be useless junk that turns out to be vital later on, decide which path to take in what is generally a maze designed by the Marquis de Sade on a bad day, and defeat a series of nightmarish monsters thrown into your path. This is what we call "fun." The advantage, of course, is that if you do get doused in watermelon-flavored acid, are shrunk to the size of a lemon drop, get carved up by a ravenous ogre wielding a door-sized axe or fall into a pit of highly-irritated aardvarks, you can always start the game again.

What an Adventure is not is totally relaxing. People have been known to become obsessed with games and play them for 72 hours straight. They then return tothe job that caused the stress they were trying to escape in the first place and mutter strange phrases while taking notes about new ways to defeat the Moon Lord's deadly maze and rescue the princess. (If fellow employees begin to avoid you more than usual, you might be spending too much time in the Crimson and Gray Halls of Wazoo, Wally.)

On the other hand, the next time you take the golden locket to the third level in the Tower of Thlingel's Doom, you just might figure out how to avoid the mirror's mindbending gaze and open the large mahogany chest.

You won't know unless you try, will you? ❑

description of an item is often a clue on how to use it. Don't forget to *look* at objects. Just remember that 99.9 percent of the objects are there for a reason.



```
   -(Press any key for more)-
The darker Lord of Fire uses such
creatures to survey his dominion.
  The snake-like creature hovers there
its single blue eye staring
unblinkingly... With a cry it is gone
whirling through the chasms, hurrying to
report to its master.
Get Torch
  Taken.
```

For the mappers in the crowd, at least two of the areas in the game are not capable of being mapped by the grid-square method. The mine, for example, just wanders here and there. The castle can be grid-mapped; it contains rooms in a somewhat logical sequence. However, the teleporters (the pulsing diamond shapes) will disorient you somewhat. Don't overlook anything; think how things could be used with each other.

The Teleport Maze, should you get that far, can be mapped somewhat if you account for the fact that. . . *huh-uh*. Figure that bit out for yourself. One portion of it contains 25 teleportals, enough to please even the most jaded player — and that's only part of the maze. Later on you'll encounter massive, Lovecraftian architecture, as if you'd been brought to the dreaded and shunned island of R'lyeh. If your imagination is operating at full speed, you'll see what might be green ooze dripping from those Cyclopean buildings, while a quiet but sinister voice whispers, "Cthulhu fhtagn."

So, if you combine elements of the Cthulhu mythos, the Ring trilogy, Tom Sawyer, the Scout manual and Hints from Heloise, you are ready to tackle *Caladuril II — Weatherstone's End*. Break out the notebooks, the Thesaurus, the graphing paper and pencils, turn your brain up to "high" and settle down for a long siege. You are going to be frustrated and dismayed at times, but you will have a real feeling of accomplishment every time you solve one of the enigmas.

P.S. Don't come to me for advice and hints. My descriptions of the various areas are based on the extensive help Oblique Triad sent me so that I could better evaluate the game. They also swore me to secrecy. So from here on, you're on your own.

Good luck to you. It's going to be a tough but enjoyable journey.

(Oblique Triad, 32 Church St., Georgetown, Ontario, Canada L7G 2A7, 416-877-8149; $32 US, $38 CDN, $2.50 S/H)

—John M. Hebert

Software CoCo 1,2 & 3

Kcal— Calendar-Generation for Your DMP-Compatible

Kcal is a hybrid (part BASIC and part machine language) calendar-generation program that allows you to print a calendar 7 inches high by 8 inches wide with your comments and notes inserted in the appropriate dates.

To use *Kcal*, you must have a Color Computer 1 or 2 with at least 32K of memory and Extended Color BASIC, or a Color Computer 3. Other equipment required includes a dot-matrix printer and a cassette or disk drive. I received the disk version.

Once booted with a `RUN "KCAL"` statement, a menu appears that gives you the option to load, save, edit or print a file. There is also a "quit" option.

Kcal is very easy to use; the 18-page manual is well-written and quite explanatory — it even has a "Hints and Help" section and a "Notes" page.

I consider the Edit File function to be the heart of the program, for here is where you will spend the most time. Upon entering this option, you are prompted for the year you want to view. The calendar-generation calculations are based on January 1, 1988, so you can view only the years from 1988 forward. After you choose the year, you are asked which month of that year you want. Pressing only the ENTER key will return you to the year prompt. Once you select a month, a calendar for that month appears on the screen. Moving a cursor up, down or across the month, you can stop on any date, enter a message consisting of three lines with up to 15 characters each, then move to another date or return to the month or year prompts.

> ***"I have seen many appointment-maker and a few calendar-maker programs in my computer experience, but I think Kcal has them all beat. . . ."***

The Print File option outputs a calendar to your printer in a 7-by-8 inch format. The size is nice, and the calendar is easy to look at, in standard calendar format with the month spelled out at the top followed by the year, both in expanded print. The days of the week are spelled out across the top of the "date-box" columns, with each "date-box" being approximately 1 inch square. Your message for a date, if any, is printed at the bottom. There is enough room for you to write notes at a later time, such as for a doctor's appointment or dinner engagement.

I experienced no problems using any of the program's functions. *Kcal* is very user-friendly. (Although there is no way to set your printer's baud rate from inside the program, you can do this before running *Kcal*.) I was inserting and editing messages within a few minutes of running the program. I actually found myself having fun as I retrieved my commercial-type calendar from the dining room and began entering special dates, federal holidays and friends' and relatives' birthdays.

I have seen many appointment-maker and a few calendar-maker programs in my computer experience, but I think *Kcal* has them all beat, especially when it comes to performance and the bottom line — price. It's hard to find a better deal for your DMP-compatible, although it would be nice to be able to use this program with other printers.

(King Cottage Industries, 1814 Valley St. NE, Poulsbo, WA 98370, 206-697-5576; $6: First product review from this company appearing in THE RAINBOW.)

—Richard L. McNabb

Software CoCo 1,2 & 3

Hard Drive Utilities— Support for *Hyper-I/O*

More and more CoCo owners are purchasing hard drives these days, turning their already powerful systems into super-powerful setups. And it seems that nearly all of these hard drive owners are using the Burke & Burke *Hyper-I/O* operating system. New users quickly learn that hard drives

Live rock 'n roll -- a cool jazz band -- a baroque trio
Do it all yourself with the help of your CoCo!

If you've never heard what a CoCo and a MIDI synthesizer can do together, you're in for a real treat! Your CoCo can act as a sophisticated music controller. Use it to compose music on a graphics screen that looks just like printed music, and then play it on your synthesizer for incredible 8-part music. Or use it as a ten track tape recorder; advanced programming then lets you edit, modify, and perfect your performance as much as you wish.

Rulaford Research
P.O. Box 143
Imperial Beach, CA 92032
(619) 690-3648 (evenings 6-10 PT)

- Lyra (an 8 part MIDI music composition program; a great way to enjoy all the music you could never hope to play!) $59.95
- Lyra Lybrary (a 16 disk collection of music transcriptions for Lyra) $14.95 each disk
- The Lyra Companion (a 100 page book packed with tips on using Lyra) $9.95
- CoCo MIDI 3 (a complete professional quality MIDI sequencer) $150.00
- FBEDIT (Edit and create new voices for the FB-01) $29.95

can easily become cluttered, overflowing with files. Finding that one file you need can become a real undertaking — taking hours, if not days, to unclutter a hard drive system. *Hard Drive Utilities* was written with these *Hyper-I/O* users in mind.

Before you attempt to run this software you must first have *Hyper-I/O* booted in memory with the correct drivers loaded. The software will operate on a CoCo 1, 2, and 3 with at least 64K of memory, Disk BASIC and Extended Color BASIC. The main program is completely commented and easy to modify if you want to custom-design it to your system.

Hard Drive Utilities is a piece of cake to boot — simply run `HDUTIL.BAS`. After you run it, a menu of options will appear (you choose an option simply by pressing its number). The options will let you back up device to device, back up to floppies, restore from floppies, search/copy/rename/kill files and more.

These options are self-explanatory, and they all offer the hard drive user helpful utilities. I especially liked Option 3, Backup Hard Drive to Disk. The advantage of this option over other look-alike software is that every sector of a floppy disk is used; the files are backed up in a compressed format. This allows maximum storage per floppy for your system. The compressed files backed up to disk cannot be read normally by BASIC until they are restored to the hard drive under Option 4. It is not necessary to back up the entire hard drive; you can back up just a specified section. This is a fabulous feature. Many times I only want one area of my hard drive backed up.

Another super feature of this software is its ability to use wildcard filenames. So, if you need to search for a file but you can't remember the exact spelling of its filename, the wildcard feature can be a big help.

Hyper-I/O users whose hard drives are stuffed full of files will really appreciate this software. It operated efficiently on my 30-Meg hard drive, searching for files. I used *Hard Drive Utilities* on both my 64K CoCo 2 and on my 512K CoCo 3, but the software didn't even know the difference between the two machines. It would have been nice if the author had distinguished between the CoCo 2 and the CoCo 3 so that CoCo 3 users wouldn't have to endure the 32-column screens.

The software is delivered on a 35-track floppy disk with seven pages of documentation, and the disk is not copy-protected. If you're pulling your hair out trying to find lost files within your hard drive, *Hard Drive Utilities* is just what the doctor ordered.

(KB Enterprises, 435 Brightwaters Drive, Cocoa Beach, FL 32931, 407-799-3253; $21.95 plus $1.50 S/H: First product review from this company appearing in THE RAINBOW.)

—Brian R. Smith

Software

CoCo 1,2 & 3

The Black Grid— Riddle of the Black Box

Logic puzzles — they drive me crazy! I once helped a friend get revenge on a Rubik's Cube by blowing it to kingdom-come with a 30-30! Really! I'll show you the video tape.

Well, despite that, I keep buying them. I own several logic games for my CoCo 3, but none of them have caused my hair loss to accelerate as quickly as *The Black Grid* from SPORTSware.

The game is played on an eight-by-eight grid by a single player. You use the joystick to place yourself (the cursor) at the end of a row of blocks and shoot an invisible ray down the row, trying to locate hidden targets. There can be from two to nine targets hidden, depending on the difficulty level selected. The object is to find all of them in as few shots as possible. One of four things can happen on each shot: a hit, a detour, a reflection or a clean miss.

Hits and reflections produce a single marker where you are standing, while misses and detours produce two markers, one where you are standing and one at the point where your ray exited the grid. From these markers, you must deduce the locations of the hidden targets in the grid. When you think you know where one is, place your cursor on the block and press the firebutton to mark it. You can change your mind at any time until you actually end the game.

Are you unimpressed? Does this sound too easy? Let me warn you, don't underestimate this puzzle. At the higher levels, this could make the preacher cuss!

Oh, sure, with only two or three targets, it's fairly easy to figure out where they are hidden. At four and five that ray starts to bounce around inside the grid a little. At six and seven, you'd better have some coffee ready because you're going to be up for a few hours. At eight and nine it might be time to switch from coffee to something a bit stronger. It's not impossible for the ray to bounce around in the grid and exit through the block right next to where you are standing — and hit absolutely nothing. It's also possible for the ray to be fired from the upper-left corner and register a hit on a target that is hidden in the lower-right corner. Since you can't fire diagonally, that may sound quite impossible. I assure you, it's possible. I've been there!

Once you've decided where you think all the targets are, press the E key and they will be revealed to you. You will be charged 10 penalty points for each wrong guess.

The game, and I use that term loosely, is played on any CoCo 3 using the Shack's regular or deluxe joystick. Don't try Atari sticks with an interface; they won't work. The program arrived on disk with no indication as to whether a tape version is available. I would hope that tape is available since some newer CoCoNuts don't have drives yet, and I would hate to see them miss out on this.

Two practice games are included as a tutorial to help you learn the rules. Study them — you'll need them later.

When you register a miss or a detour, two markers are generated, one at each end point. When another miss or detour is registered, two more markers of a different color are generated. This makes keeping track of individual shots a breeze.

At the higher levels a "peek" feature is included to let you sneak a peek every now and then. Use of the peek feature costs you points, so use it sparingly!

Instructions for play are also located right in the program. This makes it very difficult to misplace them. I always like to have hard copy of program instructions, but in this case that may be impossible. Game play is easier to understand by using the tutorial rather than looking at a diagram. The only necessary instructions are printed right on the disk: `RUN "BLK GRID"`.

The Black Grid does not have a lot of "bells and whistles." It doesn't need them. With this type of game they only get in the way.

The only fault, if you can call it that, is that joystick control is somewhat sensitive.

If you move the stick too quickly you'll find yourself jumping all over the grid. This is due mostly to the limitations of the stick itself, not the program.

A couple of things should be noted if you are considering buying the game. At the higher levels especially, the game may be too difficult for the younger set to play. This is a thinking person's game all the way, and there are too few of this type around. You really have to think!

Also, you will probably need to take time to study the in-program instructions and go through the practice games. If you don't, it's easy to become confused by what those little markers are telling you.

The Black Grid sells for $21. If you enjoy pulling your hair out over logic games, spend the money. You'll be bald in no time.

(SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, 419-389-1515; $21)

—William Baird

Software CoCo 1 & 2

Rustler— Word Games at the Scaffold

Rustler is a Hangman-type game written in BASIC for CoCos 1, 2 and 3 with at least 32K of Extended BASIC. Cassette and disk versions are available. As everyone knows, Hangman is a game in which players try to guess the letters to a word without hanging their "man."

Rustler comes with a file called `WORDS`, which is a list of 500 words from which the program randomly chooses words for play (but never the same word twice in one play). Other files included are three utilities: `FSORT`, a machine language program, and `REDIT` and `RCOPY`, two BASIC programs. We'll talk about these utilities later.

Upon loading and running *Rustler*, you are greeted by the title screen and a song that plays for a short while. The screen changes after the song and you are asked for the filename of the file that contains words you want to use.

When the word file has been located and loaded by *Rustler*, the playing screen is then drawn in `PMODE 3` graphics. This screen contains the scaffold, an area for the letters you guess and an area for the word to be guessed. Every letter you enter is displayed onscreen to save you from making the same choice twice. If you do choose a letter already given, the program notifies you of this.

Correctly guessing the word results in a rendition of the song *I'm an Old Cowhand From The Rio Grande*. If you run out of guesses, *The Ballad of Tom Dooley* is played. Either way, you get to see the word you were trying to uncover.

Now for the utilities.

The BASIC program `REDIT` allows you to create your own list of words. A word file can hold up to 500 words of one to 20 letters each. `REDIT` loads and executes the file `FSORT`, which handles the majority of the input/output needed to create a word list.

Another available option lets you check for exact duplicates of words in a file. The manual states that this procedure takes about 10 minutes, but checking a file of 500 words with three duplicate words on my 64K CoCo 2 took less than three minutes. You can also print or edit a word file.

I had the opportunity to talk to the author of this program, and he brought to my attention a fatal error that can occur when using `REDIT` and inserting words into a file. This error occurs if the user accidentally enters a non-alphabetic character into the word list. (The manual

Premium Printer Systems
CoCo I, II & III Compatible

MULTI-FONT PRINTER
NX-1000
NEW

7 Color Printer for Your CoCo

The NX-1000 gives you plenty of print options for attractive printing. Four typestyles. Four pitch sizes, in standard and italics for a total of 32 NLQ modes. The NX-1000 Rainbow gives you all these features plus online access to 7 color printing and graphics. Black, blue, red, yellow, green, violet, and orange. Both models have a 1 year warranty and a 30 day online trial.

NX-1000 SPECS: 144 cps Draft, 36 cps NLQ (18 x 23 dot matrix), 4 NLQ Fonts, Italics, Sub & Superscripts, Emphasized, Doublestrike, Proportional, Condensed, International, Downloadable, Quad Tall, Double Tall, Underline, 9+ Pitchs, Forward and Reverse n/216" Line Feeds, Absolute or Relative Vert. & Horz. Tabs, Left, Center or Right Justification, 8 Graphics Modes to 1920 dpl, Macro Instruction, Bidirection, Adjustable Tractor Feed, 200+ Printable Characters, Semi Auto Sheet Feed, Front Panel Soft Touch Control, Epson and IBM Emulate, 4k Data Buffer, Hex Dump.
Rainbow: Same plus color.

NX-1000 SYSTEM INCLUDES:
- Star NX-1000 Printer
- Blue Streak Ultima
- Software Support Trio

$199.95 +$10 Shipping & Ins.
COMPLETE

NX-1000 RAINBOW SYSTEM INCLUDES:
- Star NX-1000 Colour Printer
- Blue Streak Ultima
- Software Trio
- Color Super Gemprint

$279.95 +$10 Shipping & Ins.
COMPLETE

The Smallest, Sleekest, Fastest Serial To Parallel Converter You Can Buy!

7 Switchabel Baud Rates
300 • 600 • 1200 • 2400 •
4800 • 9600 • 19200

Use this "smart" cable to connect a Centronics parallel printer to any version CoCo or use it to improve performance of your current printer. The cables are long-life, high quality shielded cables with moulded plugs for extra durability.

Try a Blue Streak Ultima on your system for 30 days RISK FREE. One year warranty.

The Blue Streak Ultima

Powered version add $6.00.

$39.95 +$2 Shipping

BLUE STREAK ULTIMA
SERIAL TO PARALLEL INTERFACE

FREE with purchase of any NX-1000 System

Software Support Trio

Type Selection/Tutorial
Online instructional program that will select 24 special features of your printer or display methods to incorporate them into your programs.

Super Gemprint
Will transfer Pmode 0, 1, 2, 3, or 4 picture screen to printer 8"x11" hardcopy. Black/white, white/black or grey level shading for color.

Hi-Res Super Gemprint
Disk software that will transfer a Hscreen 1, 2, 3, or 4 picture screen to printer. Grey level shading for color.

FREE with purchase of any NX-1000 Printer

All Three Programs $19.95

Color Super Gemprint

Print your Graphics Screen in Color on your NX-1000 Rainbow!

Use your favorite program to create a pmode or hi-res graphic image, but don't stop there! Run our color graphics software and print a color image using a palette of 81+ colors on your NX-1000 Rainbow from a CoCo 1, 2, or 3. Requires 32k ECB Disk.

$19.95

FREE with purchase of any NX-1000 Rainbow System

Price, availability and specifications subject to change without notice.

Order Your System Today... Call (513) 885-5999

DAYTON ASSOCIATES of W.R. Hall, INC.
9644 Qualwood Trail • Spring Valley, Ohio 45370
(513) 885-5999

Visa & Master accepted within the continental U.S.
Ohio residents add 6% sales tax
COD add $3.00
Shipping charges to Canada, P.R., HI, AK, APO, FPO are double. Triple charge to all other countries.

warns you not to try to enter numbers or special symbols.)

`RCOPY` is used to back up the machine language program, `FSORT`.

Some people might think *Rustler* would be too simple a game for them. But let me tell you, as a 33-year-old, that I found *Rustler* to be quite challenging at times and also fun to play. So did my wife and our daughter. Trying to guess words with 20 characters is hard enough, but a lot of games were also lost trying to guess words with only three characters, and I still have not gone through the whole 500-word list.

Rustler and its accompanying programs are very user-friendly, and the author seems to have thought out each program well. I myself am looking forward to more programs from this company. *Rustler* is an excellent value.

(King Cottage Industries, 1818 Valley St. NE, Poulsbo, WA 98370, 206-697-5576; $5: First product review from this company appearing in THE RAINBOW.)

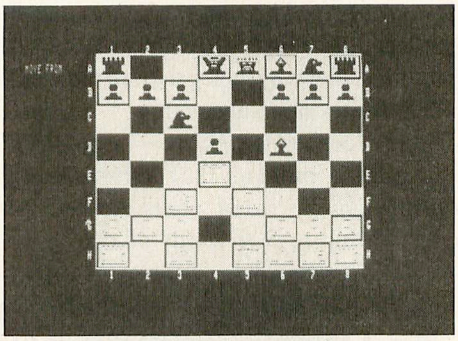
Software CoCo 3

Chess-Nuts— Chess on a Shoestring

Chess-Nuts, the new program offered by Mousesoft Software for the Color Computer 3, requires a disk drive and RGB monitor. It is a chessboard simulator rather than a game in itself. No rules of chess are implemented, including the basic one that white always moves first, and no concession has been made for a player who wants to take on the computer. Also, the game does not supply the rules of chess, nor does it cancel illegal moves.

The software is loaded by entering the `LOADM "*"` command. Once the game has been loaded, it executes automatically — a nice touch. A Set/Reset graphics title screen appears, and then the program switches to the CoCo 3's Hi-Res graphics. The program presents a menu and offers options for going to the board screen or exiting from the program. The graphic representation of the chess pieces is sharp and accurate, but this benefit would be lost without the RGB monitor. Those with a TV or composite monitor would not appreciate the software because the colors would *not* be correct, and the 80-column text, which is all that is utilized, would not be legible.

Play commences when the coordinates for a piece are entered. The piece disappears and returns to the screen when the second set of coordinates is entered. Coordinates are presented in a fashion similar to those in the game Battleship. The columns are numbered one to eight, and the rows are labeled A to H.



One nice feature of the program is the ability to replace a piece on the board. This comes in handy when an opponent captures one of the pieces either intentionally or accidentally. Simply specify the color, piece and position, and it returns to the screen. This convenience is also useful when the player needs to promote a pawn that has reached the opposite end of the board. Pieces can replace those already in play.

The program's manual is a small pamphlet that slides into the disk jacket — a useful location for preventing the loss of the instructions. The information is adequate for loading and playing. The text is easy to understand, requiring only a brief viewing before playing a game. Someone can run the program in five minutes, ready to challenge a friend to a quick round of chess. A game save feature lets users carry on prolonged games.

The program is simple to operate but lacks many features that could have been included. The price of this game is $19.95 — relatively steep for a CoCo program of this caliber. People looking for a computer program that doesn't require another player should look elsewhere. However, if you want a computerized version of a chess game that is ready to play against an opponent (and allows cheating), then *Chess-Nuts* is a good deal.

(Mousesoft Software, P.O. Box 18038, Milwaukee, WI 53218, 414-466-3617; $19.95: First product review from this company appearing in THE RAINBOW.)

—Fred Miller

Software CoCo 1, 2 & 3

Floppy Filer— Keep Your Files Organized

My computer time is precious to me. After all, there are only so many hours in a day, and I can't spend *all* of them in front of the computer. That's why I hate to misplace a program. I want to spend quality time with my computer; I don't want to spend valuable minutes trying to remember which floppy holds the application I need to complete a project. I need to know where everything is when I need it. I need to keep my disks organized.

That's why the program *Floppy Filer* is perfect for me. The program, which runs on any CoCo, creates an alphabetized list of all of your disks. When you run the program you are presented with the following choices, which are selected using the up and down arrow keys:

1) Input Disk Directory
2) Sort List
3) Save List to Disk
4) Load List from Disk
5) Print List
6) Set Parameters
7) Quit

The first time you run the program, you will want to choose Option 6, Set Parameters, first. This option lets you enter the default drive and the printer baud rate. You can change the default drive and baud rates easily.

Once you have entered the defaults, Option 1, Input Disk Directory, asks for a one- to seven-character identifier (name) for the disk in the drive. The program then reads the disk's directory and stores the directory in the computer's memory, so you won't have to replace the program disk after each directory is read. The program sorts according to filename, and it takes four minutes to sort a maximum of 1150 files. A message is displayed if you reach the maximum file limit. You can then save the current list and begin a new one. When the list is saved to disk, the data file has an extension of `.FPF`.

When loading a list from disk, the

program will display a "File not Found" message if the name of the file entered can't be located. If this happens, you are prompted to re-enter the filename.

If you send the data to a printer, the information is printed in three columns, each containing the filename and extension followed by the disk identification. When you print to the screen, you can return to the menu rather than listing all the files.

Before ending a session, the program will verify that you really want to quit. If you didn't want to quit, it will return you to the menu. If you have a CoCo 3, you should either reboot or turn off the computer after using it because some commands won't work after ending the program.

Floppy Filer is written in BASIC but includes a machine language sort. The disk is not copy-protected, so you can (and should) make a backup for your own use. The thorough instructions are supplied in an eight-page booklet.

I liked *Floppy Filer*; it's functional and easy to use. The program can help you avoid hours of frustration when you try to locate an elusive program. If you want to organize your floppies and make your computer time a little more efficient, then this program is for you.

(Gregory Software, Box 573, Kirkland, IL 60146, 815-522-3593; $8: First product review for this company appearing in THE RAINBOW.)

—Lee Deuell

Software CoCo 3

Wargame Designer Icon Disk #1— A Strategist's Tool

"Front rank...Fire!" Crack! "Rear rank . . . Fire!" Crack! "Front rank . . . Fire!" *Crack!*

The Zulus stopped momentarily as the volleys tore into their ranks, then came on again. And again, but bravery was no match for rifles and the disciplined British Army. This time. There was also, after all, the Battle of Isandhlwana — the British Army's version of Custer's Last Stand.

SPORTSware's *Icon Disk #1* is out, wargamers. You can recreate the Battle of Rorke's Drift with one of the eight terrain/units sets. You need a CoCo 3, a disk drive and the *Wargame Designer* package (see the August 1988 review of *Wargame Designer*). The neat part is that you don't really need any artistic talent, which was a great comfort to me. Oh, sure, you can modify the available symbols/graphics just as you can on the original *Wargame Designer* system. In fact, I've already modified the standard military symbol for self-propelled artillery. Piece of cake.

> ***"This icon disk is for the serious wargamer, one who knows what happened at Rorke's Drift, during the Wagonbox Fight or at the second Battle of Tobruk."***

*** ultra * ultra * ultra ***

ULTRA-BASE

The ultimate database program for the CoCo 1, 2, or 3 with at least 64K.

Keep track of over 500 names and addresses, with up to 32K of information in memory at any time.

Alphabetizes by first or last word in any of the seven categories.

Arranges positive numbers in numerical order.

Multiplies any two designated categories to obtain lists with total value.

Prints mail labels with up to four lines from any designated categories.

Very "user friendly", just make choices from the self-explanatory menu to tell the program what you want to do. 64K Tape or Disk.

ULTRA-MERGE

Create personalized letters, forms etc. using your favorite word processor program and ULTRA-BASE.

Use your word processor program to create an ASCII master copy of a letter (or whatever), leaving blanks at various strategic places within it.

Then, use ULTRA-MERGE to print personalized copies of this letter by filling in the letter's blanks with data taken from the categories you specify within the designated ULTRA-BASE files. Print one letter for each record in the specified ULTRA-BASE file, or you can write the letter for a designated name, zip code, town, state or whatever. 64K disk.

ULTRA-CAT

Organize your program collection in a fast and nearly effortless manner. Simply insert one of your program disks into the drive, and ULTRA-CAT reads them and creates a 7-category ULTRA-BASE file describing the contents of that disk. Keep a separate file for each of your disks, or merge all of the individual files into one massive file containing information on about 1000 different programs - and this entire file can be in memory at one time! Then, using the powerful sorting, editing, and printing abilities of ULTRA-BASE itself, you can have the most organized program collection in the country. Requires at least 64K.

Three ULTRA Ideas from

● ULTRA-BASE DISK OR TAPE... $24.95
● ULTRA-BASE AND ULTRA-MERGE. $39.95
● ULTRA-BASE AND ULTRA-CAT... $39.95

ULTRA-BASE, ULTRA-MERGE, AND ULTRA-CAT................ $54.95

ADD $2.00 S/H
ADD $4.00 FOR U.P.S.
ADD $3.00 FOR C.O.D.
PA residents Add 6%
Sales Tax

TO SEE TOTHIAN'S OTHER INNOVATIVE IDEAS - WRITE AND HAVE YOUR NAME PLACED ON OUR FREE MAILING LIST.
NO OBLIGATION.
FREE CALENDAR PROGRAM WITH YOUR SUMMER ORDER

Tothxa

TOTHIAN SOFTWARE
Box 663
Rimersburg, PA 16248

There is no instruction booklet. You don't need one, either. All the help you need is contained in the one-step-at-a-time menu, plus your basic knowledge of the *Wargame Designer* system, undoubtedly learned from juggling the odds on your attacks against Moscow. The instruction booklet that comes with *Wargame Designer*, as you already know, gives you the modification and design techniques.

The two-sided disk has a total of eight unit/terrain sets, plus palette color files. The sets include the following:

1. humans, elves (spelling *a la* Tolkien) and Orcs
2. standard military symbols (U.S. Army type)
3. humans and ghosts (plus things that go bump in the night)
4. robots
5. desert armies (8th Army and Afrikakorps?)
6. British and Zulus
7. adventurers (and adventuresses)
8. Cowboys and Indians

You don't need to start from scratch to view both sides of the disk. While in the Examine Icons mode on one side, just flip the disk over before returning to the main menu. Since you're not dealing with a picky OS-9 setup, CoCo could care less about the data or execution directory.

Once you've chosen which set to use, transferring it to a game disk is ridiculously easy. The series of menus and steps prevents all goofups except deliberately premeditated acts of electronic hara-kiri. OK, so now you've got a whole new set of icons on a game disk. Simply consult the *Wargame Designer* booklet on building a new game, using the regular steps to assign terrain features and units. This is now the time to modify the icons to suit yourself.

You should do this on a spare gaming disk, that is, one that you *meant* to transfer the new icons to and intend to change the map and scenario on. Otherwise, if you start to play a previous game, you are going to have a very strange-looking map. Even the newest Tolkien recruit is not going to mistake the terrain around Moscow for Minas Tirith or the Pelennor Fields.

SPORTSware says that newer versions/scenarios of *Wargame Designer* will use a joystick to control menu selection and play. While this will be handier than plunking away at the keys, hopefully we'll be allowed an option. There are a lot of us clumsy oaves out here who have trouble with joysticks. Of course, "oaves." If that rule works with elves and loaves of bread, why not for the plural of "oaf"?

This icon disk is for the serious wargamer, one who knows what happened at Rorke's Drift, during the Wagonbox Fight or at the second Battle of Tobruk. It's especially useful to the graphically inept wargamer, who is sick and tired of trying to draw his or her own symbols and having them look like somebody crawled inside the monitor and got crazy with a blunt crayon. By the way, you can also print out an "inventory" of each set for future reference and note-taking when you're recreating a battle.

On the other hand, if you don't already have *Wargame Designer*, the *Icon Disk #1* won't do you a bit of good unless you like looking at excellent graphics for their own sake.

My only suggestion would be to add the capability to move the unit icons *or* terrain icons or both, just in case some of us do want Orcs and elves at the Battle of Moscow.

Bottom line: an excellent buy.

(SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, 419-389-1515; $15)

—John M. Hebert

Software CoCo 3

Digitizer 3— Collect a Library of Sounds

Sound digitizing has been around for a long time, and in different forms, from early radio and phonograph records to laser discs and sound synthesizers. Now the CoCo can digitize sound with a program like *Digitizer 3*. *Digitizer 3* digitizes sound "samples" from a radio or tape recorder. A "sample" is just what you'd think — a segment of a sound and not the whole thing.

After a very colorful bootup, you press the BREAK key to begin: The word "digitize" issues from the monitor or TV speaker. Only if your right joystick is plugged in can you continue with the program and make selections from the menu. (Here's an important hint the directions neglect to mention: You must keep your printer turned off, or you will have printer garbage every time you play back a sample.) *Digitizer 3* uses the speed-up poke to ensure that the digitized sound is crisp and clear.

From the main menu selection you can choose Option 1, "Test Tape," to hear what a taped recording would sound like digitized. The second selection lets you actually digitize a sound sample. The third selection lets you play back your digitized sample or a sample you loaded in. Selections 4 and 5 save and load samples. Selection 6 lets you view the directory.

To load a sample you have to type in your selection. (Since the program is joystick-driven anyway, it would be nice if you could use the joystick to choose the sample you want from a directory.) The documentation is fair.

Digitizer 3 lets you choose "delay" and speed of your sample, both in recording and playback. The faster the speed you use to record the sample, the higher the quality (think of the three recording speeds on a VCR: The slower speed yields more recording time but at the expense of quality; conversely, the higher speed yields higher quality but less recording time).

With this program you can have fun digitizing various samples of instruments, voices or any recorded sound, even from the radio. It would be nice, however, if you could make the samples a lot longer and somehow incorporate them into other programs for special effect (Those who know their way around a piece of BASIC code may be able to do this).

As an ex-music teacher, I would appreciate having much longer samples and being able to digitize a whole song or piece of music and then record it back onto tape, from which it could be played through a stereo system. Of course, sound digitizing programs are memory hogs — a digitized sample can easily build until it expands beyond what memory and storage devices can hold. But this program is good for what it does, generating short samples of digitized sounds.

(DSD Software, 12 Undercliff Drive, Scarborough, Ontario M1M 1A5, 416-267-8920; $12.99: First product review for this company appearing in THE RAINBOW.)

—Hadley Hazen

Received and Certified

The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, *your assurance that we have seen the product and have ascertained that it is what it purports to be.*

CC3Flags, a one- to six-player game of world conquest for the CoCo 3. The goal is to employ your armies to conquer all the territory you can. It uses the CoCo 3's 16-color screen and features keyboard or joystick control. *SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, (419) 389-1515; $21.*

CoCo 3 Game Disk, a menu-driven collection of 10 Hi-Res board-type games written in BASIC for the CoCo 3. The games come in three categories: "brain" games (*Up Top*, *Letters* and *Swap*); puzzles (*Daisy*, *Numbers*, *Switch* and *Squares*); and two-player games (*Trap3*, *Indian Giver* and *Hounds*). For the CoCo 3 and a disk drive. *Aftamonow Software, 46 Howe St., Milford, CT 06460, (203) 878-3602; $10.*

◆ **CoCoRun-12**, a program that does "pseudo multitasking" of CoCo 2 programs. The programs to be managed by *CoCoRun-12* cannot modify the BASIC ROMS — *CoCoRun-12* assumes you are always in all-RAM mode. *CoCoRun-12* is incompatible with programs that require 64K (which means they do a ROM/RAM switch). Requires a 512K CoCo 3. *Roger Hallman, 2150 S. 32 St., Milwaukee, WI 53215, (414) 383-1532; $19.95.*

DIR-MGR+, a disk directory management program that backs up the current directory to an unused granule, writes the backup to Track 17, repositions a filename in a directory, inserts "dummy" filenames, and kills or renames files. Hard copies of the directory can be printed in two or three columns. Requires a 64K CoCo 1, 2 or 3 and a disk drive. *Mike Forrest, 14030 Peyton Drive, #203, Dallas, TX 75240, (214) 235-0256; $14.95.*

Disassembler, a program that will disassemble files with a starting address greater than or equal to 15000 (3A98 Hex — can be offset) and an ending address less than or equal to 27600 (6BD0 Hex). Outputs in decimal or Hex. *BDS Software, P.O. Box 485, Glenview, IL 60025, (312) 998-1656; $5.*

Foods II, a program that prints out your daily and average intakes of protein, carbohydrates, fat and calories after you input one or more days of what you eat from a list of 181 foods. Comes on tape or disk for 64K disk systems or 16K cassette systems. A printer capable of printing 90 columns is required. *Mike Forrest, 14030 Peyton Drive, #203, Dallas, TX 75240, (214) 235-0256; $14.95.*

King's Quest III: To Heir is Human, the next installment of the *King's Quest* series for the CoCo 3. For years the evil wizard Manannan has been kidnapping young boys to be his slaves, then slaying them before their 18th birthdays, when invariably they begin to think of escape. Now it is you who is approaching an 18th birthday. Can you secretly learn magic and outsmart Manannan? The program comes on five disks for the 512K CoCo 3; hard drives are supported. *Sierra On-Line, P.O. Box 485, Coarsegold, CA 93614, (209) 683-4468; available at $34.95 from Tandy Express Order, (800) 321-3133, No. 26-3285.*

KJV37, the books of Galatians, Ephesians, Philippians, Colossians, I Thessalonians and II Thessalonians of the King James version of the Bible on disk in ASCII format for CoCos 1, 2 and 3. The text can be imported into a word processor that supports ASCII. *BDS Software, P.O. Box 485, Glenview, IL 60025, (312) 998-1656; $3.*

Leisure Suit Larry in the Land of the Lounge Lizards, a 3-D animated game that features Larry, 40 years old and single (and a bit of a nerd), just looking for the kind of girls his mother warned him about. The player becomes Larry for a night, making the rounds of bars, casinos and discos, propositioning women, trying to lose his. . .nervousness. The characters "walk, talk, and even ignore your best pickup lines." Requires a 512K CoCo 3 and a disk drive. *Sierra On-Line, Inc., P.O. Box 485, Coarsegold, CA 93614, (209) 683-4468; $39.95.*

Lister, a program for owners of the Smith-Corona L-1000 Daisy-Wheel printer that lets them print out BASIC listings. The program to be listed must be saved in ASCII on Drive 0. *BDS Software, P.O. Box 485, Glenview, IL 60025, (312) 998-1656; $5.*

Menu Maker, a program that lets users design menu screens and then writes a BASIC program to display that screen. The resultant program also supports menu choice selection and contains simulated subroutines for each selection. *Gregory Software, Box 573, Kirkland, IL 60146, (815) 522-3593; $8.*

◆ **Nine-Times**, a bimonthly magazine on disk devoted to OS-9, containing articles, reviews, programs and their documentation. Requirements include a CoCo 3 with 128K or 512K, a disk drive and OS-9 Level II. *JWT Enterprises, 5755 Lockwood Blvd., Youngstown, OH 44512, (216) 758-7694; $34.95 for one-year subscription.*

Peninsular War, a one-player strategic simulation of Wellington's peninsular campaign against the French during the Napoleonic War of 1805. The player takes the part of the British commander defending Spain against the computer-controlled French force. For the CoCo 3 and a disk drive; RGB monitor recommended. *SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, (419) 389-1515; $21.*

Wargame Designer II, an upgrade to a military strategic construction set that includes the Wargame Designer game design system and four ready-to-play scenarios. New features include a new menu system, a new icon editor, default values for all modifiers and unit attributes, and the addition of joystick control in all modules. Users create their own scenarios, armies and battlefields. For a CoCo 3 floppy disk system. *SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615, (419) 389-1515; $25.*

◆ **First product received from this company**

The *Seal of Certification* is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the program does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

—Lauren Willoughby

A print utility for OS-9

PR.BO9

By Richard Ries

OS-9 is wonderful. It is small and tight as an operating system, and quite useful once you've learned the ropes. But many times when I list a program, I find a line of code sitting on a perforation, so I wrote `PR.B09`, a print utility that:

1) Titles each page

2) Skips over perforations

3) Indents BASIC09 listings

4) Converts too-long lines into right-sized ones

5) Splits compound lines into multiple lines

6) Puts an extra form-feed in at the end of the listing to make tearing the paper off easier.

The program, once written and packed, is invoked from the OS-9 prompt:

```
pr("your_file_path")
```

To run it as a background task, use:

```
pr("your_file_path")&
```

Or it can be run from BASIC09 with:

```
run pr("your_file_path")
```

Richard Ries is an electronics technician who integrates hardware and software at work, and programs at home.

The Listing: `Pr`

```
PROCEDURE pr
0000      (* print BASIC09 files with pagination *)
0029      (* and indentations. *)
0040      (* USAGE:
0049      (* " pr("pathname") *...
005F      (* -if just " pr " is typed, a usage message *)
008E      (* be shown *)
009C
009D      ON ERROR GOTO 130
00A3
00A4      PARAM filename:STRING[24]
00B0
00B1      (* declare variables *)
00C8      DIM xx:INTEGER
00CF      DIM slash:INTEGER
00D6      DIM init:BOOLEAN
00DD      DIM indent:BOOLEAN
00E4      DIM yy:STRING[2]
00F0      DIM jump:STRING
00F7      DIM dayt:STRING[12]
0103      DIM linein,temp:STRING[256]
0113      DIM linecount,pagecount:BYTE
011E      DIM disk,printer,pointer:BYTE
012D
012E      (* declare constants *)
0145      DIM MAXLINE:INTEGER
014C      DIM PAGELEN:INTEGER
0153      DIM FF:STRING[1]
015F      DIM LF:STRING[1]
016B      DIM DQ:STRING[1]
0177      DIM DOUBLE:STRING[1]
0183      DIM SINGLE:STRING[1]
018F
0190      (* Assign values *)
01A3      (* max chars. per line *)
01BC      MAXLINE:=70
01C3      (* max lines per page *)
01DB      PAGELEN:=66
01E2      (* form feed *)
01F1      FF:=CHR$(12)
01F9      (* line feed *)
0208      LF:=CHR$(10)
0210      (* double quotes *)
0223      DQ:=CHR$(34)
022B
022C      (* GEMINI PRINTER CODES
0244      (* DOUBLE- width print
025A      DOUBLE:=CHR$(14)
0262      (* GEMINI PRINTER CODES
027A      (* single- width print
0290      SINGLE:=CHR$(20)
0298
0299      (* initial indent length *)
```

```
02B4         jump:="     "
02C0         (* no indentations, yet *)
02DA         indent:=FALSE
02E0         (* this is the first time through *)
0304         init:=TRUE
030A
030B         (* set up date *)
031C         RUN date(dayt)
0326
0327         OPEN #disk,filename:READ
0333         OPEN #printer,"/p":WRITE
0340
0341         (* loop until file is done *)
035E         WHILE NOT(EOF(#disk)) DO
0369           (* get line *)
0377           READ #disk,linein
0381
0382           (* remove line feeds to prevent double- spacing *)
03B5           REPEAT
03B7             pointer:=SUBSTR(LF,linein)
03C3             IF pointer<>0 THEN
03CF               temp:=RIGHT$(linein,LEN(linein)-pointer)
03E0               linein:=LEFT$(linein,pointer-1)+temp
03F3             ENDIF
03F5           UNTIL pointer=0
0400
0401           (* is this the first page? *)
041E           IF init THEN
0427             GOSUB 120
042B             init:=FALSE
0431           ENDIF
0433
0434           (* is this a new procedure? *)
0452 100
0456           IF LEFT$(linein,9)="PROCEDURE" THEN
046E             (* yes- mark it *)
0480             linein:="***   "+linein
0490           ELSE
0494             (* Is it a line number?  Comments are indented,too *)
04CA             IF LEFT$(linein,1)>"9" OR LEFT$(linein,1)="(" THEN
04E5               (* is there a key word? *)
04FF               IF LEFT$(linein,2)="IF" OR LEFT$(linein,3)="FOR" OR LEFT$

                    (linein,4)="LOOP" OR LEFT$(linein,5)="WHILE" OR

                    LEFT$(linein,6)="REPEAT" OR LEFT$(linein,6)="EXITIF"

                    THEN
055A                 (* if so, then indent *)
0572                 indent:=TRUE
0578               ENDIF
057A               (* is it an END- word? *)
0593               IF LEFT$(linein,3)="END" OR LEFT$(linein,4)="NEXT" OR

                    LEFT$(linein,5)="UNTIL" THEN
05C2                 (* decrease indent size if not "END" *)
05E9                 IF LEN(linein)>4 THEN
05F6                   jump:=LEFT$(jump,LEN(jump)-2)
0606                 ELSE
060A                   (* reset the jump length *)
0625                   jump:="     "
0631                 ENDIF
0633               ENDIF
0635               (* if the word is "ELSE" then decrease indent *)
0665               (* size, and indent after the line is printed. *)
0696               IF LEFT$(linein,4)="ELSE" THEN
06A9                 jump:=LEFT$(jump,LEN(jump)-2)
06B9                 indent:=TRUE
06BF               ENDIF
06C1
06C2               (* add indent to input line *)
06E0               linein:=jump+linein
06EC             ELSE
06F0               (* we got a line number *)
070A               pointer:=SUBSTR(" ",linein)
0716               (* add some spaces *)
072B               temp:=LEFT$(linein,pointer)+jump
```

Constants are declared at the beginning of the program. The printer codes are for a Star Gemini 10 and are listed in the initializing portion of the program. If your printer uses other codes, replace the ones there with the ones you need. (They should be in your printer's manual.)

> ***"Control words, such as For, While or Repeat cause an indentation on the next line. The end words like Next, Endwhile or Until cause 'outdentation'."***

How it Works

`PR.B09` is commented, so you can follow the program's details. One of the first lines, even before the parameter declarations, is the error-trapping line. This allows you to type in the program's name alone, and the program tells you how to use it. `PR.B09` reads a line from a file and looks for certain words and symbols. If one is found, the line is adjusted as necessary, then printed. Comments, remarks and quotes are skipped over. Lines with backslashes (\) are split at the backslash.

Control words, such as `For`, `While` or `Repeat` cause an indentation on the next line. The end words like `Next`, `Endwhile` or `Until` cause "outdentation". If the line is too long to fit on the printer, it is split at the last available space. The first part is printed, the remainder treated as a newly input line. This repeats until the line is less than the maximum line length. After all lines are printed, the program goes to the end of the page and sends out a form feed to allow a tear at the perforations.

`PR.B09` shows one of the nice things about OS-9. If you don't like the way something works, you can write a program to replace it.

(Questions or comments concerning this program may be addressed to the author at 361 Deauville, Blvd., Copiague, NY 11726. Please be sure to enclose an SASE when requesting a reply.) ❑

```
073B          linein:=LEFT$(temp,5)+RIGHT$(linein,LEN(linein)-pointer
                 )
0753        ENDIF
0755      ENDIF
0757      (* are we close to the end of the page? *)
0781      IF linecount>PAGELEN-6 THEN
0791        GOSUB 120
0795      ENDIF
0797
0798      (* if line is too long, do word- wrap *)
07C0      WHILE LEN(linein)>MAXLINE DO
07CE        (* look for last space, and break there *)
07F8        FOR xx:=MAXLINE TO MAXLINE-20 STEP -1
0813        EXITIF MID$(linein,xx,1)=" " THEN
0826          (* just leave *)
0836        ENDEXIT
083A        NEXT xx
0845
0846        (* adjust pointer *)
085A        xx:=xx-1
0865        (* trim line *)
0874        temp:=RIGHT$(linein,LEN(linein)-xx)
0885        linein:=LEFT$(linein,xx)
0891
0892        (* search for quotation marks, comments, and backslashes *)
08CD        GOSUB 110
08D1
08D2        (* print the line, and adjust it *)
08F5        PRINT #printer,linein
08FF        linecount:=linecount+1
090A        linein:=jump+temp
0916        (* end of too- long line routine *)
0939      ENDWHILE
093D
093E      (* regular- length line, and remainder of too- long line *)
0979      temp:=""
0980      (* search for quotation marks, comments, and backslashes *)
09BB      GOSUB 110
09BF
09C0      (* print the line, and adjust it *)
09E3      PRINT #printer,linein
09ED      IF indent THEN
09F6        jump:=jump+"  "
0A03        indent:=FALSE
0A09      ENDIF
0A0B      linecount:=linecount+1
0A16      (* end of file loop *)
0A2C    ENDWHILE
0A30    CLOSE #disk
0A36    (* go to end of page *)
0A4D    PRINT #printer,FF
0A57    (* add extra blank page *)
0A71    PRINT #printer,FF
0A7B    CLOSE #printer
0A81    END
0A83
0A84 110
0A88    (* test for comments, quotes and backslashes *)
0AB7    FOR xx:=1 TO LEN(linein)
0AC9
0ACA      (* check for comments *)
0AE2      yy:=MID$(linein,xx,2)
0AF0      IF yy="(*" THEN
0AFE        (* if there is one, look for matching comment *)
0B2E        FOR xx:=xx+1 TO LEN(linein)
0B44          yy:=MID$(linein,xx,1)
0B52        EXITIF yy="*)" THEN
0B60          yy:=""
0B67        ENDEXIT
0B6B        NEXT xx
0B76      ENDIF
0B78
0B79      yy:=MID$(linein,xx,1)
0B87      (* check for quotation marks *)
0BA6      IF yy=DQ THEN
0BB3        (* if there is one, look for matching quote *)
```

Using OS-9 Programs on RAINBOW ON DISK

One of the most common questions we encounter daily is "How do I boot the OS-9 side of my RAINBOW ON DISK?" This is a very broad question, indeed. It entails several aspects of OS-9, many of which are not readily apparent to the novice user.

First, the OS-9 side of RAINBOW ON DISK is *not* bootable. That is to say, the disk does not contain any of the OS-9 system files necessary for operation under OS-9. In order to use the OS-9 files on RAINBOW ON DISK, you must first purchase the OS-9 operating system from Radio Shack. Then you must boot the operating system according to the instructions in the OS-9 manual.

Let's travel this tangent for a moment — it is somewhat important to understand the situation. The OS-9 operating system for the Color Computer is available only from Radio Shack and its authorized dealers. To the best of my knowledge, the only *bootable* OS-9 applications software you will find is marketed by Tandy. No third party software is directly bootable — you *must* purchase OS-9 from Radio Shack before you can make use of any programs offered anywhere but by Radio Shack.

Once you have booted OS-9, you can go to work with RAINBOW ON DISK. How you go about it will depend on your current system. If you are using OS-9 Level I, enter the following command line at the `OS9:` prompt:

```
load dir list copy
```

This will load the `Dir`, `List` and `Copy` commands from the `CMDS` directory of your system disk in Drive 0. After this, when you issue one of these commands, it will execute from memory. This is faster and also allows you to remove the OS-9 system master from the drive. Just don't issue any other OS-9 commands until you have put the system master back in Drive 0. Users of OS-9 Level II will be happy to know the operating system automatically loads these commands into memory when it boots. Now you are ready to insert RAINBOW ON DISK and get under way.

```
0BE1           FOR xx:=xx+1 TO LEN(linein)
0BF7             yy:=MID$(linein,xx,1)
0C05           EXITIF yy=DQ THEN
0C12             yy:=""
0C19           ENDEXIT
0C1D           NEXT xx
0C28         ENDIF
0C2A       EXITIF yy="\" THEN
0C37         (* print line to backslash *)
0C54         slash:=xx
0C5C         (* subroutine to print compound lines *)
0C84         PRINT #printer,LEFT$(linein,slash-1)
0C95         linein:=RIGHT$(linein,LEN(linein)-slash)+temp
0CAA         jump:=jump+"  "
0CB7         linecount:=linecount+1
0CC2         indent:=FALSE
0CC8         GOTO 100
0CCC       ENDEXIT
0CD0       NEXT xx
0CDB       RETURN
0CDD
0CDE 120
0CE2       (* print header *)
0CF4       IF init THEN
0CFD         pagecount:=1
0D04       ELSE
0D08         FOR xx:=1 TO 5
0D18           PRINT #printer
0D1E         NEXT xx
0D29       ENDIF
0D2B
0D2C       PRINT #printer,dayt;
0D37       PRINT #printer,DOUBLE;
0D42       PRINT #printer,TAB((50-LEN(filename))/2); filename;
0D59       PRINT #printer,SINGLE;
0D64       PRINT #printer,TAB(50); "Page no: "; pagecount
0D7E       PRINT #printer
0D84       linecount:=2
0D8B       pagecount:=pagecount+1
0D96       RETURN
0D98
0D99
0D9A
0D9B 130
0D9F       (* error- handling routine *)
0DBC       errno:=ERR
0DC3       PRINT
0DC5       IF errno=215 OR errno=216 THEN
0DDA         PRINT "File "; filename; " not found!"
0DF5       ELSE
0DF9         IF errno=56 THEN
0E06           PRINT
0E08           PRINT "Usage: pr ("; DQ; "filepath"; DQ; ")"
0E2E           PRINT
0E30           END
0E32         ENDIF
0E34         PRINT "Error #"; errno
0E43       ENDIF
0E45       END
0E47
0E48
PROCEDURE date
 0000      (* set up to print as month-day-year *)
 0027      PARAM dayt:STRING[12]
 0033      DIM month:INTEGER
 003A      DIM mo(12):STRING[3]
 004B      DIM xx,yy:INTEGER
 0056
 0057      month:=VAL(MID$(DATE$,4,2))
 0064      FOR xx:=1 TO 12
 0074        READ mo(xx)
 007D      NEXT xx
 0088      dayt:=mo(month)+"."+MID$(DATE$,7,2)+",19"+LEFT$(DATE$,2)
 00A9      DATA "Jan","Feb","Mar","Apr","May","Jun","Jul","Aug","Sep",

            "Oct","Nov","Dec"
 00F5      END
```

If you are using a single floppy-drive system, replace the system master in Drive 0 with RAINBOW ON DISK and enter `chd /d0`. If you have two floppy drives, leave the system master in Drive 0, place RAINBOW ON DISK in Drive 1 and enter `chd /d1`. In either case, the `chd` command tells OS-9 what disk and directory you want to work with. It selects your *current data directory*. Until you use `chd` to select a different working directory, OS-9 will assume you want the commands you enter to act on the files in the selected directory.

Now, to see what is in the *root* directory of RAINBOW ON DISK, just type `dir` and press ENTER. You will see one file named `read.me.first`. You will also see at least one file listed whose name is in all uppercase letters. This is *not* a file. The accepted standard used with OS-9 dictates that we use all uppercase letters to indicate a "file" is really a subdirectory. So, you will see `CMDS` and/or `SOURCE` listed as subdirectories on the disk. To get to the `CMDS` directory, enter `chd cmds`. This selects the `CMDS` directory as your working directory. Enter `chd ..` to get back to the root directory. You can now enter `dir` to see what is in that directory. You can also use `copy` to copy the files to your system disk if you want. The `CMDS` directory is used to hold compiled C or assembled ML programs. If no assembly or C programs are published in a given month, you won't find this directory on the disk.

On the other hand, the `SOURCE` directory contains any ML, C or BASIC09 source code, as well as any procedure files published that month. We don't put `packed` BASIC09 files on RAINBOW ON DISK. It is expected that you will load the source and `pack` it, if you want, following the instructions in the BASIC09 manual.

To get to the `SOURCE` directory from the root, type `chd source` and press ENTER. If you have selected `CMDS` as your current directory as above, you can get to `SOURCE` by typing `chd ../source` and pressing ENTER. Once there, you can use `dir` to see the contents of this subdirectory. You can also use `list` to see the actual source code files or `copy` to copy the files to another disk.

As a final word, before you can use any of the programs on RAINBOW ON DISK, you will have to know what they do and how to use them. You can gain this information by reading the articles in the magazine.

—**Cray Augsburg**

Barden's Buffer

16ECB

Years ago, the question would have baffled puzzle freaks — for CoCo users, the solution takes about a minute.

Perplexing Puzzles

By William Barden, Jr.
Rainbow Contributing Editor

I'm a puzzle freak, but I've never had a flair for solving puzzles quickly. I'd rather find the answer to a puzzle with brute force on a computer. It's amazing what can be done on the CoCo to solve puzzles. In this column I'll provide some old and new ones, all of which can be solved on the CoCo by clever or not-so-clever programming. I'll give you the answers, but I'll also give you four puzzles without answers, which I'll provide in a later column.

Puzzle 1: Programs in Memory

A CoCo buff named Rupert has three free slots in his Multi-Pak Interface. He has seven game cartridges, labeled A, B, C, D, E, F and G. In how many different combinations can Rupert arrange three game cartridges from the seven? One way is to insert cartridges A, B and C. Another is to insert cartridges A, B and G. Order is not important (it doesn't matter which slots the three cartridges fit in).

Solution

This problem is known as a "combination of *n* things taken *k* at a time". To make the explanation easier, suppose we have five cartridges labeled A, B, C, D and E, and three empty slots. We could use these combinations:

ABC, ABD, ABE, ACD, ACE, ADE, BCD, BCE, BDE and CDE

A way to list all the combinations is to start at the left of the list of all things; A, B, C, D, E; and pick the first three: ABC. Now substitute a new item for the last item, working towards the right: ABD, ABE. The AB sequence is now exhausted, so move to the right and work with AC — ACD and ACE. The AC sequence is now exhausted, so move to the right and work with AD — ADE. All three item sequences starting with A, have been exhausted, so move to the right and work with BC — BCD, BCE and then BD — BDE. Finally, work with CD — CDE, and so on.

This process can be implemented in a program as shown in Listing 1. It finds all combinations of seven things taken three at a time — the three slots of the Multi-Pak filled with seven cartridges. Variable `P` represents the index 1 to 7 of the far left item of the three, Variable `Q`, the index of the middle item, and Variable `R`, the index of the far right item. The three variables index into array `A$`, which is filled with A, B, C, D, E, F and G. The three variables are changed just as they are manually, moving from left to right. The print lists all possible combinations — 35 in all:

```
ABC   ACE   AEF   BCG   BFG   CFG
ABD   ACF   AEG   BDE   CDE   DEF
ABE   ACG   AFG   BDF   CDF   DEG
ABF   ADE   BCD   BDG   CDG   DFG
ABG   ADF   BCE   BEF   CEF   EFG
ACD   ADG   BCF   BEG   CEG
```

Puzzle 2: Buying Disks

Diskettes at one Radio Shack store in Pudd, Wyoming are sold 16, 17, 23, 24, 39 and 40 to a package. A customer wants exactly 100 disks, no more, no less. Assuming that packages cannot be broken, are there any combinations of packages that will make up exactly 100 disks, or will the customer have to travel to the Pudd Computerland store for his purchase? (Adapted from an old Henry E. Dudeney puzzle.)

Solution

You could work this out manually, but I just hate to waste scratch paper when there's a perfectly good CoCo ready to crunch through hours of comparisons. . . Here's a little preprocessing to make the problem palatable: There cannot be any more than six 16-disk packages — that's 96 disks. Similarly, there cannot be more than five 17-disk packages, 85 disks, four 23-disk packages, four 24-disk packages, two 39-disk packages, or two 40-disk packages. Therefore, 100 disks will have to be made up from these 23 packages:

16, 16, 16, 16, 16, 16, 17, 17, 17, 17, 17, 23, 23, 23, 23, 24, 24, 24, 24, 39, 39, 40, 40

There cannot be more than six packages (seven packages of 16 disks is 112 disks). Also, there has to be more than two packages (two 40-disk packages is 80 disks). There are three to six packages to make up 100 disks, if this is even possible.

A computer solution to this is shown in Listing 2. It's similar to the first problem — 23 things taken three to six at a time. For each combination, a check is made to see if the combination equals exactly 100 items. If so, the answer is printed. There will be some redundancy as the program works through packages that hold the same number of items. Listing 2 shows the combinations of six

---

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years' experience in the industry covers a wide background: programming, systems analysis and managing projects for computers ranging from mainframes to micros.

items. The variables and total computation can easily be changed for three, four and five items. However, when the program is run for six items from a possible 23, a result is found:

16+, 16+, 17+, 17+, 17+, 17+ = 100 disks

This technique can be found for other similar problems. In Computer Science classes, the classic problem is a "Knapsack" problem: Given a knapsack that can hold 60 pounds, what is the optimum packing of various items weighing different amounts and with varying degrees of value?

Puzzle 3: Palindromic Square Numbers

A *palindrome* is a number or word which reads the same forwards or backwards (the most famous palindromic sentence is "A man, a plan, a canal — Panama!"). An example of a palindromic number is 12344321. How many squares of 1 to 1000 are palindromic? A square of 1 is 1, of 2 is 4, of 3 is 9, of 4 is 16, of 25 is 625, and so forth.

Solution

It would have baffled puzzle freaks years ago. On the CoCo, however, it takes only about a minute. The program is shown in Listing 3. The trick is to convert the numeric form of the number to a string so the digits can be compared. This is done easily by the `STR$` function. However, this function uses a leading sign, a blank when the number is positive, as all squares are. The `RIGHT$` function lops off the leading blank.

The program uses two variables — `L`, which points to the leftmost digit of the string, and `R`, which points to the far right digit of the string. If the leftmost and far right digits are the same and the `R` and `L` pointers cross, the square is palindromic and is printed. The results are:

1	1
2	4
3	9
11	121
22	484
26	676
101	10201
111	12321
121	14641
202	40804
212	44944
264	69696
307	94249
836	698896

It's interesting to note that only the last square has an even number of digits and that 10 of the numbers are also palindromic.

There are fewer cubes that are palindromic, but all cube roots of palindromic cubes to 1000 are palindromic. Modify the program to `J=I*I*I` to find them.

Puzzle 4: Interest Compounding

I recently received a pleasant surprise. One of my forefathers had invested one month's salary in 1688 — a total of $1 — at the then phenomenal rate of 8 percent interest per year in First Pilgrim Savings and Loan in Massachusetts. He evidently forgot about it and it wasn't until recently that First Pilgrim was able to track down the only surviving relative — me. The account called for the interest to be compounded at the end of each year, that is, added to the principal amount. At the end of the first year, the $1 had risen

VIP Writer 1.1
RATED "BEST" IN SEPT '88 "RAINBOW"
VIP Writer has all the features of VIP Writer III described elsewhere in this magazine except the screen widths are 32, 51, 64 & 85. Screen colors are black, green & white, double clock speed is not supported, Spooler and menus are unavailable because of memory limitations. Even so, VIP Writer is the BEST word processor for the CoCo 1 & 2! Version 1.1 includes the configuration program and RGB Hard Disk support. Includes VIP Speller 1.1 DISK $69.95
Available through Radio Shack Express Order Cat. #90-141
Writer owners: upgrade to Writer 1.1 for $20 + $3 S/H. Send only original disk and $23 total.

VIP Speller 1.1
INCLUDES 50,000 WORD DICTIONARY
VIP Speller works with ANY ASCII file created by most popular word processors - even Telewriter 64. It automatically checks text files for words to be corrected, marked for special attention or even added to the 50,000 word Dictionary. You can even view the word in context. Words can be added to or deleted from the dictionary or you can create your own dictionary! New features of version 1.1 are FASTER and more reliable disk access and printing at 9600 baud. DISK $34.95
Speller owners: upgrade to Speller 1.1 for $10 + $3 S/H. Send original disk and $13 Total.

VIP Calc 1.1
"MORE USEABLE FEATURES" FEB. 1985 "RAINBOW"
VIP Calc has all the features of VIP Calc III described elsewhere in this magazine except the screen widths are 32, 51, 64 & 85. Screen colors are black, green and white, double clock speed and Spooler are not supported. Even so, VIP Calc is the most complete calc for the CoCo 1 & 2! Version 1.1 has faster and more reliable disk access and improved display speed. DISK $59.95
Calc owners: upgrade to Calc 1.1 for $10 + $3 S/H. Send only original disk and $13 total.

VIP Database 1.1
"ONE OF THE BEST" JUL '84 "RAINBOW"
VIP Database has all the features of VIP Database III described elsewhere in this magazine except the screen widths are 51, 64 & 85. Screen colors are black, green and white, double clock speed and Spooler are not supported. Even so, VIP Database is the most complete database for the CoCo 1 & 2! Version 1.1 has faster and more reliable disk access and single spaced reports. DISK $49.95
Database owners: upgrade to Database 1.1 for $10 + $3 S/H. Send only disk and $13 total.

VIP Disk-ZAP 1.1
RAVED ABOUT IN THE APRIL 1983 "RAINBOW"
Now you can retrieve lost data on any disk. VIP Disk-Zap is the ultimate repair utility for repair of most disk errors. VIP Disk-Zap verifies diskettes, reads and writes any sector and lets you retrieve all types of bashed text files, BASIC and ML programs. VIP Disk-Zap includes an informative 50 page tutorial manual. New features of version 1.1 are FASTER and more RELIABLE disk access and printing at up to 9600 BAUD. DISK $24.95
Disk-Zap owners: upgrade to Disk-Zap 1.1 for $10 + $3 S/H. Send original disk and $13 Total

$149.95 + S/H.
VIP Library
"For a lot of people...the library may be as complete a software package as they'll ever need!"
-RAINBOW Apr. 89
The VIP Library 1.2 combines all 6 updated VIP programs - Writer, Calc, Disk-Zap, Database, Terminal and Speller - into 1 program, VIP Desktop. 64K req.
See Offer Below!!
Available through Radio Shack Express Order Cat. #90-213.
VIP Library orders add $4 S/H USA, $5 Canada & $10 Foreign

VIP Integrated Library owners: upgrade to the VIP Integrated Library 1.2 for $45 + $3 S/H. Send only ORIGINAL disk and $48 total.

SPECIAL OFFEER: Upgrade from ANY VIP program to the VIP Library for $99.95 + S/H. Send only the VIP diskette with order.

VISA / MC Order line 1-800-322-9873 EXT 3
SD Enterprises info line (805) 566-1317
P. O. Box 621 Carpinteria Ca 93013
Non Library orders add $3 S/H in USA, $4 Canada, $6 Foreign. COD orders add an additional $2.75. Checks allow 3 weeks for delivery. Calif. res. add 6% tax.

to $1.08, at the end of the second year, the $1.08 had risen to $1.08 * 1.08 = $1.16, and so on. How much did I collect — $2037, $50766, $127,536 or $10, 644, 533, 790?

Solution

Incredibly, I collected $10,644,533,790! (However, taxes were $10,644,533,780.) Listing 4 shows the computations. A single dollar invested for nine years at 8 percent interest, with interest compounded (added to the principal) once per year is worth 1.08* 1.08 * 1.08 * 1.08 * 1.08 * 1.08 * 1.08 * 1.08 * 1.08 = $1.99900463, about twice the original principal.

As an approximate rule of thumb: If you take the interest rate and divide it into 72, you'll find the number of years it takes for the principal to double. For example, an account with 12 percent interest will double in 72/12=6 years. The $1 in the First Pilgrim account doubles in 9 years to $2. At the end of 18 years, it's worth $4. At the end of 27 years it's worth $8. At the end of 36 years, $16. At the end of 45 years, $32; 54 years, $64; 63 years, $128; 72 years, $256; 81 years, $512; 90 years, $1024; 99 years, $2048; 108 years, $4096; 117 years, $8192; 126 years, $16,384; and so forth.

Listing 4 also handles compounding at intervals of greater than one year. If interest is compounded quarterly, that $10,644,533,790 turns out to be worth $20,902,886,000! The difference is that interest on interest earns more money. If the interest is compounded monthly, the accumulated amount is $24,461,233,600. If the interest is compounded daily, as in many accounts, the accumulated amount is $26,419,329,300. If you think that compounding has diminishing returns, you're right. Suppose the money was compounded every second? Or every 1/10 second? The growth reaches a limiting amount - about $26,800,000,000. CoCo BASIC, with it's high precision, is ideally suited for such interest computations, and is at least as accurate as mainframe computers.

Puzzle 5: A Cryptarithm

A *cryptarithm* is a puzzle in which letters are substituted for digits in an arithmetic problem. The answer is usually solved by logical reasoning. For example, the cryptarithm:

```
 SEAM
  x T
MEATS
```

can be worked out to be:

```
 4973
  x 8
39784
```

A different type of cryptarithm (attributed to Joseph Ellis Trevor) is:

```
  PPP
   PP
 PPPP
PPPP
PPPPP
```

where each P is a prime digit of 2, 3, 5 or 7. For example, the result could be 53572. What is the correct answer?

Solution

The key to this puzzle is in the possible permutations that the multiplicand (the number on the top) and the multiplier (the number on the second line) can take. Unlike the combinations of Puzzles 1 and 2, permutations are order dependent. Let's consider the multiplicand first. There are four possible digits per position and four digit positions. Starting from the lowest number, it's easy to count up:

2222
2223
2225
2227
2232
2233
2235
2237
2252
2253
2255
2257
2272
etc.

Just count as you would in counting decimal numbers, moving to the next higher digit position when necessary. The last numbers in this sequence are:

7772
7773
7775
7777

As there are four digits — 2, 3, 5 and 7 — the total number of permutations is 4 to the forth, or 256. The multiplier has two digits and can be 22, 23, 25, 27, 32, 33, 35, 37, 52, 53, 55, 57, 72, 73, 75 and 77 — 16 permutations in all.

This means there are 256 times 16 = 4096 permutations that can be checked for validity in a computer program. Each of the two partial results and the final result can be checked to make certain they contain only the digits 2, 3, 5 or 7. Listing 5 shows the program.

The variables in this program are arranged as follows:

```
      A3 A2 A1
         B2 B1
   C4 C3 C2 C1
D5 D4 D3 D2
R5 R4 R3 R2 R1
```

The multiplicand starts at 222 and the multiplier at 22. For each pass through the program the multiplier is incremented — 22 becomes 23, which becomes 25, which becomes 27, which becomes 32, and so forth up to 77. At 77, the multiplier is reset to 22 and the lowest digit of the multiplicand is incremented. 4096 permutations are processed, from 222/22 through 777/77. For each permutation, the digits of the multiplicand, multiplier, partial results, and result are checked to see if all are 2, 3, 5 or 7. If so, the answer is displayed and the program continues. If not, the program continues. The five lines of digits are also kept as single numbers for ease of computation — variables `A`, `B`, `C`, `D` and `R`. The single answer is displayed as:

```
        7  7  5
           3  3
     2  3  2  5
  2  3  2  5
  2  5  5  7  5
```

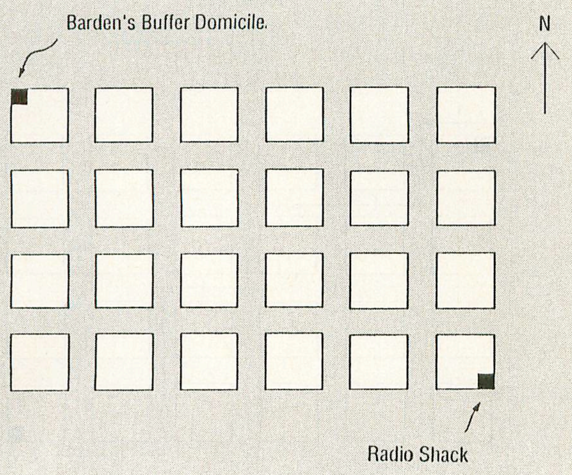


Figure 1

Puzzle 6: Random Number Generator

A CoCo scientist wants to generate a series of random numbers. She decides that a good way to do it is to square a four-digit number and take the four middle digits as the new number, square the new number, take the four middle digits, and so forth. The number she uses as the "seed" for the random number generator is 3792. Why is this not a good idea?

Solution

One has to be very careful in generating random numbers. Most schemes produce numbers that are not truly random at all. It's not sufficient to say — "Well, I'll start with a number, multiply by 27,128, add 10,000, and then divide by 34." In the scheme of this puzzle, starting with 3792 produces 3792*3792 = 14,379,264. Taking the middlefour digits of the result produces 3792 again. The random number sequence is, therefore, 3792, 3792, 3792, etc. The program that illustrates this is in Listing 6A.

A better random number generator multiplies some seed number by a prime, adds a prime, and then truncates the result, as shown in Listing 6B.

A sequence produced by this code is:

```
20680
31642
42604
53566
64528
 9954
20916
```

Notice anything unusual about it? Right — there are even numbers only. We'll leave it up to the reader as an exercise to come up with a good random number generator. A good random number generator should have an even distribution of the digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9, and should not repeat more often than a few billion numbers or so. The code in BASIC is from $BF3B. . . .

ARIZONA SMALL COMPUTER PERIPHERALS

20 & 30 Meg Hard Drive	Complete with drive, case, power supply & interface	From $350.00
10 Meg Hard Drive Kit	Kits are ready to run with the interface of your choice.	$160.00
5 Meg Hard Drive Kit	DISTO HD Interface $50.00 when purchased with Kit.	$120.00
EAGLE KEYBOARD & ADAPTER (IBM style)	Gain freedom from your computer / MPI	$100.00
FLOPPY DRIVES (DSDD)	QUME 40 Track double-sided drives	$ 75.00
2400bd Modem Hays compatable	Supports full AT command set.	$125.00
512K MEM UPGRADES for COCO III	Installed	$160.00
COMPUTER REPAIR	Complete repair facilities on-site.	CALL

930 W. 23rd St. Tempe, AZ 85282
(602) 829-8028

ADD $8.00 S&H
All prices US$

Puzzle 7: Getting to Radio Shack

The nearest Radio Shack store to me is located about 10 blocks away, as shown in Figure 1. I'm diagonally opposite the Radio Shack store. I usually walk four blocks south and then six blocks east to get to it. Just for fun, though, I've been varying the route. Yesterday I walked two blocks east, two blocks south, three blocks east, two blocks south, and then one block east to get to the store. Today, I'll try a different route. Assuming that I don't walk any extra blocks, in how many different ways can I get to those Archer soldering irons?

Solution

Obviously, I will never have to walk more than 10 blocks, and I'll have to walk a total of six blocks east and a total of four blocks south regardless of the route. If I let 1 represent one block east and 0 represent one block south, then all possible routes are found in the sequence:

0000000000
0000000001
0000000010
0000000011
0000000100
.
.
1111111111

Each number in this sequence is made up of 10 ones or zeroes (for the ten blocks). There are 1024 numbers in the sequence, 0000000000 to 1111111111. However, most numbers are not valid. Only those numbers that have six ones (six blocks east) and four zeroes (four blocks south), define a valid route. Figure 2 shows an example.

To find the valid routes, therefore, just count in binary from 0000000000 through 1111111111 and check each number for six ones. Each number with six ones defines a valid route. As it turns out, there is a formula to express this — it defines the number of permutations (order dependent) arrangements of routes given a fixed number of things. In this case there must be six east increments and four south increments, so the formula is:

$$= \frac{10!}{6!\ 4!} = \frac{\text{1x2x3x4x5x6x7x8x9x10 permutations}}{\text{1x2x3x4x5x6} \qquad \text{1x2x3x4}} = \frac{\text{7x8x9x10}}{\text{1x2x3x4}} =$$

$$= 7x3x10 = 210$$

The program shown in Listing 7 counts in binary from 0000000000 through 1111111111. For each value, a check is made of the number of ones. If it is six, a count is incremented and an asterisk is placed before the line listing the value. Then the route is drawn on the graphics screen. At the end of the program all 210 routes have been listed and drawn.

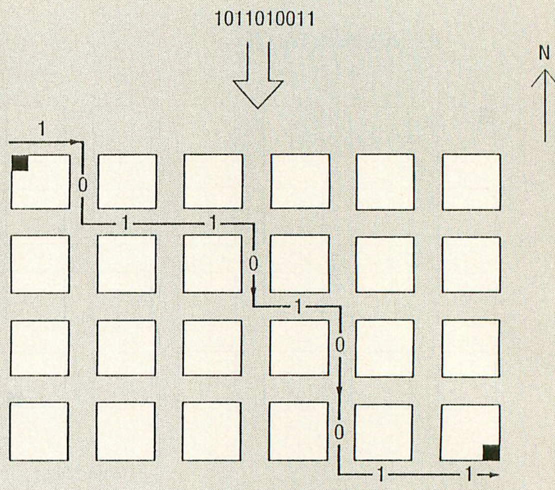


Figure 2

Puzzle 8: Compressing Data

"I have a message I want to send via the DelCompuGenie communications network, but they charge $.10 per bit. There are 28 characters in this message, 224 bits. That's $22.40 and too much to pay." moaned Murray, the CoCo hacker. "Don't worry — I can cut your costs in half. But the person on the other end must know the code.," said the CoCo Guru. How did he do it and what was the code? The message was:

```
"MARY.MERRY CHRISTMAS.MURRAY."
```

and the normal ASCII coding is:

```
01001101 01000001 01010010 01011001 00101110 01001101
01000101 01010010 01010010 01011001 00100000 01000011
01001000 01010010 01001001 01010011 01010100 01001101
01000001 01010011 00101110 01001101 01010101 01010010
01010010 01000001 01011001 00101110 = 224 bits
```

Solution

There are various data compression schemes, but one of the most popular is known as Huffman Coding. It represents the most frequently occurring characters with the fewest bits, usually starting at one or two bits. Less frequent characters may have even more than the eight bits ASCII uses, but the average character length is generally less than eight bits, often half that.

There's a purely mechanical way to get a Huffman Code. Arrange the characters used in order of use in a list. In the message above, this arrangement is:

6-R 4-M 3-A 3-Y 3-. 2-S 1-C 1-E 1-H 1-I 1-T 1-U 1-blk

Now form a "tree" node taking the two least frequent characters, as shown in Figure 3. Put this tree node in order in the list and use the next least frequent character to form a new node. Continue in this fashion until you have an entire tree. Now label left branches of the tree zero and right branches one. Reading down the tree will give the code for each character. 10001 is the code for H, for example. Now code each character of the message with its code. Notice there are no breaks for the characters. The program in Listing 8 reads the code, providing it knows the code beforehand. In a long message, this code can be sent first, before the actual encrypted message. The Huffman-encoded message here is 96 bits, only 43 percent of the 224 bits used in normal ASCII. We've used a string to hold the bits here, but in actuality, the 96 bits would

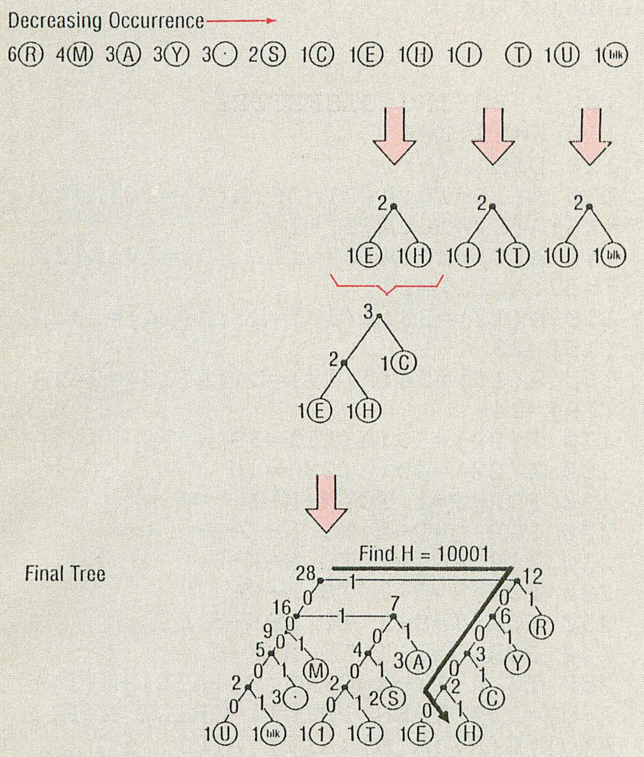


Figure 3

be held in 12 bytes.

The scheme for Huffman encoding can be used for a message of any type and any length.

Reader's Challenge

Here are four puzzles similar to the ones above. Try your hand at them and send your answers to me at the following address:

P.O. Box 3568, Mission Viejo, CA 92692

Best answers for each question will be given special mention in this column, and a genuine machine-embossed certificate of CoCo puzzle-solving prowess.

Challenge Number One

A pair of dice has six faces per die with 1, 2, 3, 4, 5 and 6 dots per face. Can you provide a program that will list all of the ways to roll a 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12 and give the odds for each number?

Challenge Number Two

Can you find a CoCo-related cryptarithm to fit this form?

```
    X X X X
  + X X X X
  ---------
  X X X X X
```

Or any form?

Challenge Number Three

In Puzzle 8, 224 bits were reduced to 96. Suppose there is a list

KEN-TON ELECTRONICS
PRESENTS
"Real" SCSI INTERFACE
– AND –
THE DUAL RS-232 PAK

HARD DRIVE INTERFACE
$89 or $119 (with RTC)
Real-Time Clock Battery-backed
L.R. Tech Compatible
Owl DOS Compatible
RGB DOS Compatible
H-DOS Compatible
OS-9 Compatible
28 Pin Rom Socket

DUAL COMM BOARD
$74 (single) $89 (Dual)
Replaces RS-232 PAK
2-6551 A.C.I.A.'s
2 Independent RS-232 Channels
Jumper Selectable for up to 4 (Four) Channels (with 2nd board)
Ultra low power draw
28-Pin ROM Socket

Build your Hard Drive the RIGHT way with a REAL SCSI Interface. All our products are MIL-Specification Quality P.C. Boards and carry a full 90 day warranty. Both the Dual Comm and the SCSI Interface work directly with a Y-CABLE or the Multi-Pak Interface and are made in the U.S.A.

CALL US FOR PRICES ON CUSTOM SYSTEMS,
HARD DRIVES AND CABLES

Terms:
Check or M.O. accepted (US Funds only)
Please add $4.00 for S & H
Phone Orders are welcomed!
Call 1-716-837-9168 (24 hr. order line)

KEN—TON ELECTRONICS
187 GREEN ACRES RD.
TONAWANDA, NY 14150

THE RGB HARD DISK

A warranty can replace your Hard Disk **Drive**, but not the **valuable data it contains!** Think about this **BEFORE** you buy a used or rebuilt hard drive.

RGB Computer Systems uses only **BRAND NEW** Hard Disk Drives, Controllers and Components, all with the **Full Manufacturers Warranty.**

Due to the unique design of our components and software, RGB also has the **fastest** and **most reliable** data transfer in the industry!

The RGB Hard Disk System fully supports both BASIC and OS-9, and provides the ability to boot up OS-9 completely from the Hard Disk without the need for special EPROMS or the loss of Disk Basic.

If you need a Fast, **Reliable** Hard Disk System and don't mind spending a few dollars more for **Quality**, please give us a call today!

RGB COMPUTER SYSTEMS
RAINBOW CERTIFICATION SEAL
294 STILLWELL AVE
KENMORE, NY 14217
(716) 876-7538

of 4096 common words (such as *cat, and, house*) that can be sent. The words are known to the sender and receiver. Can you describe a scheme that will enable a CoCo user to compress a message even more than 43 percent?

Challenge Number Four

Are there any numbers that equal the sum of the cubes of their digits? For example, the cubes of the digits of 126 are 1, 8 and 216. The sum of the cubes of the digits is 1 + 8 + 216 = 225.

See you next month with more CoCo topics. ❑

Listing 1: PUZZLE1

```
100 ' PRINT 7 THINGS TAKEN 3 AT
A TIME
110 N=7:K=3:CT=0
120 DIM A$(N)
130 A$(1)="A":A$(2)="B":A$(3)="C
":A$(4)="D":A$(5)="E":A$(6)="F":
A$(7)="G"
140 FOR P=1 TO N-K+1
150 FOR Q=P+1 TO N-K+2
160 FOR R=Q+1 TO N-K+3
170 PRINT A$(P);A$(Q);A$(R)
180 CT=CT+1
190 NEXT:NEXT:NEXT
200 PRINT CT
```

Listing 2: PUZZLE2

```
100 ' BUYING DISKETTES
110 N=23:K=6
120 DIM A(N)
130 A(1)=16:A(2)=16:A(3)=16:A(4)
=16:A(5)=16:A(6)=16
140 A(7)=17:A(8)=17:A(9)=17:A(10
)=17:A(11)=17
150 A(12)=23:A(13)=23:A(14)=23:A
(15)=23
160 A(16)=24:A(17)=24:A(18)=24:A
(19)=24
170 A(20)=39:A(21)=39
180 A(22)=40:A(23)=40
190 FOR P=1 TO N-K+1
200 FOR Q=P+1 TO N-K+2
210 FOR R=Q+1 TO N-K+3
220 FOR S=R+1 TO N-K+4
230 FOR T=S+1 TO N-K+5
240 FOR U=T+1 TO N-K+6
250 IF A(P)+A(Q)+A(R)+A(S)+A(T)+
A(U)=100 THEN PRINT: PRINT A(P);
A(Q);A(R);A(S);A(T);A(U)
260 PRINT ".";
270 NEXT:NEXT:NEXT:NEXT:NEXT:NEX
T
```

CRC COMPUTERS

NOW ONE YEAR LIMITED WARRANTY ON ALL DISTO PRODUCTS

All DISTO products are designed by well known "TURN Of The Screw" author TONY DISTEFANO

Every one can NOW afford and enjoy a DISTO Controller

DISTO

Mini Controller

The No-Extra-Cost Controller
- 2 DOS Switcher (switch included)
- NO clumsy jumpers to move
- Accepts 24 or 28 pin EPROMs

75$ DOS included (add 10$ for 2nd DOS)

See page 123, March 89 Rainbow for more info

RS-232 SuperPack 55$
- A Stand-Alone (Multi-Pak rqd.) adapter that gives the user a true RS-232 Serial Port.
- Completely compatible with OS-9's ACIA software.
- Compatible with software that requires the Tandy Deluxe RS-232 Pack.
- DB-25 cable included.

MEB Adapter 35$
To plug into your DISTO Super Add-Ons (Multi-Pak required)

Super RAM 3 ZeroK Board 25$
Free software included

RGB to Monochrome 35$ Video/Audio Adapter
See page 123. March Rainbow 89

The only floppy disk Controllers that ELIMINATES the need of a Multi-Pak

Super Controller I

Along with the included DOS, plug-in three more software selectable DOSes or 2764 or 27128 EPROMs burned to your liking.

The internal M.E.B. (Mini Expansion Bus) lets you add DISTO's incredible Super Add-ons.

99.95 $ /110$ (2 DOSes)

See page 122, March 89 Rainbow for more info

Super Controller II

NOW AVAILABLE AT YOUR LOCAL RADIO SHACK STORE
Part no: 90-2009

- Under OS-9:
- Buffered Read/Write sector achieved without halting the CPU.
- Continual use of keyboard even while reading or writing to disk.
- System's clock no longer looses time during Read & Write.
- NMI is blocked & transferred to IRQ in software for low CPU overhead.
- Completely Interrupt driven for fast & smooth Multi-Tasking operations.
- Drivers written by KEVIN DARLING

130$

Don't let anyone tell you otherwise, the WD 1773 does not have any problems with COCO 3s.
!! Only bad designs do !!

RADIO SHACK (R) which has more experience with COCO controllers than any other supplier now carry the DISTO SUPER CONTROLLER II

DISTO SUPER ADD-ONS

75$	**3 in 1 Multi Board Adapter** Parallel Printer Port, Real Time Clock and a true RS-232 Serial Port. External DC adapter required. (OS-9 Driver included)
35$	**Real Time Clock & Printer Interface** OS-9 Driver (20$)
55$	**Mini EPROM Programmer**
40$	**Hard Disk Adapter** Works with SASI & SCSI interface. No Multi-Pak needed if used with SC1 or SC2. Compatible with RGB DOS and Burke & Burke Hyper I/O. OS-9 Driver included.
70$	**Hard Disk Adapter with RS-232**

NEW EXTENDED WARRANTY SERVICE:
Any Disto Product serviced for flat rate of 20 $US (includes S/H). Call us for your R.M.A. number.

CRC COMPUTERS INC.
11 Boul. Des Laurentides, Laval, (Quebec), Canada H7G 2S3
Call for Canadian Prices Include S&H of $4 or $8 if order exceeds $75
Sorry: No personal cheques
Master Card and Visa Accepted
1-514-967-0195

Listing 3: PUZZLE3

```
100 ' PALINDROMIC SQUARE NUMBERS
110 FOR I=1 TO 1000
120 J=I*I
130 A$=RIGHT$(STR$(J),LEN(STR$(J
))-1)
140 L=1: R=LEN(A$)
150 IF MID$(A$,L,1)<>MID$(A$,R,1
) THEN GOTO 180
160 L=L+1: R=R-1: IF R<L THEN PR
INT I,A$: GOTO 180
170 GOTO 150
180 NEXT
```

Listing 4: PUZZLE4

```
100 ' INTEREST COMPUTATION
110 INPUT "PRINCIPAL:"; P
120 INPUT "% PER YEAR:"; R
130 R=R/100
140 INPUT "# OF COMPOUNDING PERI
ODS PER YEAR:"; N
150 INPUT "# OF YEARS:"; Y
160 PRINT P*(1+R/N)^(Y*N)
170 GOTO 110
```

Listing 5: PUZZLE5

```
100 ' 2-3-5-7 CRYPTARITHM
110 A3=2: A2=2: A1=2: B2=2: B1=2
120 A=A3*100+A2*10+A1
130 B=B2*10+B1
140 C=B1*A
150 D=B2*A
160 R=A*B
180 C4=INT(C/1000): C=C-C4*1000
190 C3=INT(C/100): C=C-C3*100
200 C2=INT(C/10): C=C-C2*10
210 C1=C
220 D5=INT(D/1000): D=D-D5*1000
230 D4=INT(D/100): D=D-D4*100
240 D3=INT(D/10): D=D-D3*10
250 D2=D
260 R5=INT(R/10000):R=R-R5*10000
270 R4=INT(R/1000): R=R-R4*1000
280 R3=INT(R/100): R=R-R3*100
290 R2=INT(R/10): R=R-R2*10
300 R1=R
310 IF C4<>2 AND C4<>3 AND C4<>5
 AND C4<>7 GOTO 500
320 IF C3<>2 AND C3<>3 AND C3<>5
 AND C3<>7 GOTO 500
330 IF C2<>2 AND C2<>3 AND C2<>5
 AND C2<>7 GOTO 500
340 IF C1<>2 AND C1<>3 AND C1<>5
 AND C1<>7 GOTO 500
350 IF D5<>2 AND D5<>3 AND D5<>5
```

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE

Back Issue Availability

For greater convenience, order RAINBOW Back Issues through the Rainbow Magazine Services area of our Delphi CoCo SIG.

BACK ISSUES STILL AVAILABLE

Have you explored the wealth of information in our past issues? From our very first, four-page issue to many with more than 300 pages of material, it's all just for CoCo users — a great way to expand your library!

A WORLD OF INFO AT A BARGAIN PRICE

All back issues sell for the single issue cover price. In addition, there is a $3.50 charge for the first issue, plus 50 cents for each additional issue for postage and handling if sent by United Parcel Service. There is a $5 charge for the first issue, plus a $1 charge for each additional issue on orders sent by U.S. Mail. UPS *will not* deliver to a post office box or to another country.

MOST ISSUES STILL AVAILABLE

Issues July 1981 through June 1982 are available on white paper in a reprint form. All others are in regular magazine form. VISA, MasterCard and American Express accepted. Kentucky residents please add 5 percent state sales tax. In order to hold down costs, we do not bill, and no C.O.D. orders are accepted.

Due to heavy demand, we suggest you order the back issues you want now while supplies last.

To check availability and order, review and fill out the form on the next page and mail it with your payment to:

THE RAINBOW
The Falsoft Building
P.O. Box 385
Prospect, KY 40059

BACK ISSUE ORDER FORM

(See overleaf for instructions.)

Please send me the following back issues:

MONTH/YEAR		PRICE	
VOLUME 1			
JUL '81	Premier Issue	$2.00	☐
AUG '81		$2.00	☐
SEP '81	Education	$2.00	☐
OCT '81	Printer	$2.00	☐
NOV '81		$2.00	☐
DEC '81	Holiday	$2.00	☐
JAN '82		$2.00	☐
FEB '82		$2.00	☐
APR '82		$2.50	☐
JUN '82		$2.50	☐
VOLUME 2			
JUN '83	Printers	$2.95	☐
JUL '83	Anniversary	$2.95	☐
VOLUME 3			
AUG '83	Games	$2.95	☐
SEP '83	Education	$2.95	☐
OCT '83	Graphics	$3.95	☐
DEC '83	Holiday	$3.95	☐
MAR '84	Business	$3.95	☐
APR '84	Gaming	$3.95	☐
MAY '84	Printer	$3.95	☐
JUN '84	Music	$3.95	☐
JUL '84	Anniversary	$3.95	☐
VOLUME 4			
AUG '84	Games	$3.95	☐
SEP '84	Education	$3.95	☐
OCT '84	Graphics	$3.95	☐
NOV '84	Data Comm.	$3.95	☐
DEC '84	Holiday	$3.95	☐
JAN '85	Beginners	$3.95	☐
FEB '85	Utilities	$3.95	☐
MAR '85	Business	$3.95	☐
APR '85	Simulations	$3.95	☐
MAY '85	Printer	$3.95	☐
JUN '85	Music	$3.95	☐
JUL '85	Anniversary	$3.95	☐

MONTH/YEAR		PRICE	
VOLUME 5			
AUG '85	Games	$3.95	☐
SEP '85	Education	$3.95	☐
OCT '85	Graphics	$3.95	☐
NOV '85	Data Comm.	$3.95	☐
JAN '86	Beginners	$3.95	☐
FEB '86	Utilities	$3.95	☐
MAR '86	Business	$3.95	☐
APR '86	Home Help	$3.95	☐
MAY '86	Printer	$3.95	☐
JUN '86	Music	$3.95	☐
JUL '86	Anniversary	$3.95	☐
VOLUME 6			
AUG '86	Games	$3.95	☐
SEP '86	Education	$3.95	☐
OCT '86	Graphics	$3.95	☐
NOV '86	Data Comm.	$3.95	☐
DEC '86	Holiday	$3.95	☐
JAN '87	Beginners	$3.95	☐
FEB '87	Utilities	$3.95	☐
MAR '87	Business	$3.95	☐
APR '87	Home Help	$3.95	☐
MAY '87	Printer	$3.95	☐
JUN '87	Music	$3.95	☐
JUL '87	Anniversary	$3.95	☐
VOLUME 7			
AUG '87	Games	$3.95	☐
SEP '87	Education	$3.95	☐
OCT '87	Graphics	$3.95	☐
NOV '87	Data Comm.	$3.95	☐
DEC '87	Holiday	$3.95	☐
JAN '88	Beginners	$3.95	☐
FEB '88	Utilities	$3.95	☐
MAR '88	Business	$3.95	☐
APR '88	Home Help	$3.95	☐
MAY '88	Printer	$3.95	☐
JUN '88	Music	$3.95	☐
JUL '88	Anniversary	$3.95	☐
VOLUME 8			
AUG '88	Games	$3.95	☐
SEP '88	Education	$3.95	☐
OCT '88	Graphics	$3.95	☐
NOV '88	Data Comm.	$3.95	☐
DEC '88	Holiday	$3.95	☐
JAN '89	Beginners	$3.95	☐
FEB '89	Home Help	$3.95	☐
MAR '89	Hardware	$3.95	☐
APR '89	Business	$3.95	☐
MAY '89	Printer	$3.95	☐
JUN '89	Summer Fun	$3.95	☐

RAINBOW INDEX A complete index to the first three years, July 1981 through June 1984, is printed in the July 1984 issue. Separate copies are available for $2.50 ☐

The Fourth, Fifth and Sixth Year Indexes including RAINBOW ON TAPE are printed in the July 1985, 1986 and 1987 issues, respectively. The Seventh Year Index is printed in the July 1988 issue.

TOTAL ____________

KY RESIDENTS ADD 5% ____________

U.S. MAIL CHARGE ____________
SHIPPING & HANDLING
U.P.S. CHARGE ____________
TOTAL AMOUNT
ENCLOSED ____________

Article Reprints

In instances where a given issue is now out of print and not available for purchase, we do provide photocopies of specific articles. The cost for this service is $1.50 plus 50 cents S/H per article. This service is provided *only* in the case of out-of-stock issues.

Name ____________
Address ____________
City ____________ State ______ ZIP ____________
☐ Payment Enclosed, or
Charge to my: ☐ VISA ☐ MC ☐ AE
CARD # ____________
EXPIRATION DATE ____________ PHONE ( ) ____________
SIGNATURE ____________

TO ORDER BY PHONE (credit card orders only) call (800) 847-0309, 8 a.m. to 5 p.m. EST. All other inquiries call (502) 228-4492.

```
 AND D5<>7 GOTO 500
360 IF D4<>2 AND D4<>3 AND D4<>5
 AND D4<>7 GOTO 500
370 IF D3<>2 AND D3<>3 AND D3<>5
 AND D3<>7 GOTO 500
380 IF D2<>2 AND D2<>3 AND D2<>5
 AND D2<>7 GOTO 500
390 IF R5<>2 AND R5<>3 AND R5<>5
 AND R5<>7 GOTO 500
400 IF R4<>2 AND R4<>3 AND R4<>5
 AND R4<>7 GOTO 500
405 IF R3<>2 AND R3<>3 AND R3<>5
 AND R3<>7 GOTO 400
410 IF R2<2 AND R2<>3 AND R2<>5
AND R2<>7 GOTO 500
420 IF R1<>2 AND R1<>3 AND R1<>5
 AND R1<>7 GOTO 500
425 PRINT
430 PRINT "         ";A3;A2;A1
440 PRINT "            "; B2; B1
450 PRINT "     ----------"
460 PRINT "    ";C4;C3;C2;C1
470 PRINT D5;D4;D3;D2
480 PRINT " -------------"
490 PRINT R5;R4;R3;R2;R1
500 IF B1=2 THEN B1=3 ELSE IF B1
=3 THEN B1=5 ELSE IF B1=5 THEN B
1=7 ELSE B1=2: IF B2=2 THEN B2=3
 ELSE IF B2=3 THEN B2=5 ELSE IF
B2=5 THEN B2=7 ELSE B2=2
510 IF B2<>2 OR B1<>2 THEN GOTO
530
520 IF A1=2 THEN A1=3 ELSE IF A1
=3 THEN A1=5 ELSE IF A1=5 THEN A
1=7 ELSE A1=2: IF A2=2 THEN A2=3
 ELSE IF A2=3 THEN A2=5 ELSE IF
A2=5 THEN A2=7 ELSE A2=2: IF A3=
2 THEN A3=3 ELSE IF A3=3 THEN A3
=5 ELSE IF A3=5 THEN A3=7 ELSE A
3=2
530 IF A3=2 AND A2=2 AND A1=2 AN
D B2=2 AND B1=2 THEN STOP ELSE P
RINT ".";: GOTO 120
```

Listing 6A: PUZZLE6A

```
100 ' PSEUDO-RANDOM NUMBERS
110 N=3792
120 M=N*N
130 A$=MID$(STR$(M),4,4)
140 PRINT A$
150 N=VAL(A$)
160 GOTO 120
```

Listing 6B: PUZZLE6B

```
100 ' BETTER PSEUDO-RANDOM NUMBE
RS
110 S=123456
120 S=S+64153
```

```
121 S=S+12345
130 S=S-INT(S/65536)*65536
140 PRINT S
150 GOTO 120
```

Listing 7: PUZZLE7

```
100 ' BLOCK GRIDS
110 P=0
120 I0=0: I1=0: I2=0: I3=0: I4=0
 : I5=0: I6=0: I7=0: I8=0: I9=0
130 I0=I0+1:IF I0=2 THEN I0=0:I1
=I1+1:IF I1=2 THEN I1=0:I2=I2+1:
IF I2=2 THEN I2=0:I3=I3+1:IF I3=
2 THEN I3=0:I4=I4+1:IF I4=2 THEN
 I4=0:I5=I5+1
140 IF I5=2 THEN I5=0:I6=I6+1:IF
 I6=2 THEN I6=0:I7=I7+1:IF I7=2
THEN I7=0:I8=I8+1:IF I8=2 THEN I
8=0:I9=I9+1:IF I9=2 THEN GOTO 35
0
150 CT=I9+I8+I7+I6+I5+I4+I3+I2+I
1+I0
160 IF CT=6 THEN P=P+1: PRINT "*
" ELSE GOTO 330
170 PMODE 3,1
180 SCREEN 1,0
190 PCLS
200 DRAW "BM119,90"
210 IF I9=1 THEN DRAW "R3" ELSE
DRAW "D3"
220 IF I8=1 THEN DRAW "R3" ELSE
DRAW "D3"
230 IF I7=1 THEN DRAW "R3" ELSE
DRAW "D3"
240 IF I6=1 THEN DRAW "R3" ELSE
DRAW "D3"
250 IF I5=1 THEN DRAW "R3" ELSE
DRAW "D3"
260 IF I4=1 THEN DRAW "R3" ELSE
DRAW "D3"
270 IF I3=1 THEN DRAW "R3" ELSE
DRAW "D3"
280 IF I2=1 THEN DRAW "R3" ELSE
DRAW "D3"
290 IF I1=1 THEN DRAW "R3" ELSE
DRAW "D3"
300 IF I0=1 THEN DRAW "R3" ELSE
DRAW "D3"
310 FOR I=0 TO 500: NEXT
320 SCREEN 0,0
330 PRINT I9;I8;I7;I6;I5;I4;I3;I
2;I1;I0
340 GOTO 130
350 PRINT P; "PERMUTATIONS"
```

Listing 8: PUZZLE8

```
100 ' HUFFMAN CODING
110 DIM A$(13)
120 A$(1)="11"
130 A$(2)="001"
140 A$(3)="011"
150 A$(4)="101"
160 A$(5)="0001"
170 A$(6)="0101"
180 A$(7)="1001"
190 A$(8)="10000"
200 A$(9)="10001"
210 A$(10)="01000"
220 A$(11)="01001"
230 A$(12)="00000"
240 A$(13)="00001"
250 B$="RMAY.SCEHITU "
260 C$="001011111010001001100001
11110100001100110001110100001010
10010010110101000100100000111101
11010001"
270 I=1
280 FOR J=1 TO 13
290 IF MID$( C$, I, LEN( A$( J )
 ) ) = A$( J ) THEN GOTO 320
300 NEXT
310 STOP
320 PRINT MID$( B$, J, 1 );
330 I = I + LEN( A$( J ) )
340 GOTO 280
```

Conquer the World!

DOMINATION $18
MULTI-PLAYER STRATEGY GAME!
Try to take over the planet of YCNAN. Battle other players armies to take control of their provinces and defend yours. Play on a Hi-res map of the planet. Take the "RISK" and be a planet-lord today!!! Requires 1 disk and joystick or mouse. See Rainbow Review JULY 88

MYDOS $15
EPROMABLE! CUSTOMIZABLE!
MYDOS is an enhancement to Disk Extended Basic 2.1 on the CoCo 3. Screen echo and SAY command for RS Speech Pak. Point and click mouse directory. **NEW FEATURES!** Supports D/S and 40 track drives. Power-up in any screen colors (or monochrome), width, and palettes (RGB or CMP) you wish! **More options than you can shake a joystick at!** See Rainbow Review JUNE 87

HAWKSoft
P.O. Box 7112
Elgin, Il. 60121-7112
312-742-3084
S/H always included.
Check COD or MO accepted
Il orders add 7% sales tax

RAINBOW CERTIFICATION SEAL

HAWKSoft KEYBOARD CABLE $25
UNCHAIN YOUR KEYBOARD! Five foot extender cable for Coco II and 3. Move your keyboard where you want it! Installation instructions and tips included! Custom lengths available.

KISSable OS-9

OS-9 Level II

Building Two Handy Tools

By Dale L. Puckett
Rainbow Contributing Editor

Many times during the past year I've wished for a utility to find a file buried somewhere 10 levels deep in the bowels of an OS-9 directory tree. Since that utility has never surfaced, I decided it would make a good project and an excellent subject for a BASIC09 programming tutorial. Because of the nature of the problem and the path traveled to find the solution, I'm presenting two handy utilities this month — *DiskDir* and *Find*. We'll make an intermediate stop at *Find It* and consider several diversions along the way. Even though this month's code looks simple, the process used to get there is not.

First, Heed This Advice!

Back up those hard disks before something happens!

You may have noticed that "KISSable OS-9" didn't appear last month. I was too busy finding out that if you tempt fate long enough, it'll find your number. In February, my 20-megabyte hard disk was wiped out by a runaway program. It may have been a virus or worm carried in a program someone sent my way, or it may have been because I was half asleep after a long day at the salt mine and wasn't paying close enough attention. I'll never know the answer, because I'm not going to run the suspect program again. In fact, I won't plug that disk into any of my drives unless it's to format it.

I must have read a hundred articles urging me to back up my hard disks during the past year. Unfortunately, I didn't heed the warnings. As a result, I spent all my spare time for two or three weeks attempting to restore lost data. Believe me, it takes a long time to restore a hard disk when the data it contained is spread across 150 unorganized floppy disks. Even more time and money is consumed when you have to return to your favorite online service and download many of the files a second time. So back it up, now!

One good thing did come out of the rebirth of my hard disk, however. I paid a lot more attention to my organization, right from the start. For example, I now have only 12 files — nine are directories at the root level.

And I paid attention to the all-important, though not highly advertised, `IT.SAS` byte in the hard-disk descriptor. When I first received the hard-disk drive, I must have been going through another of those careless periods. Frank Hogg sent me a device descriptor for the new hard drive with the `IT.SAS` byte set at 1. Not paying attention, I loaded hundreds of files before I noticed the mistake. Before long, access to the files on the hard disk slowed down to the sleepy pace of an original Radio Shack 35-track floppy disk running with an unmodified 30-millisecond stepping rate — well, maybe not quite that slow.

After discovering the error, I used one of the public-domain *Dmode* utilities to change the `IT.SAS` byte to `$20`. Then I cobbled a new OS-9 boot file, and access to files created after the change came like greased lightning. After the crash, I installed a device descriptor with the proper `IT.SAS` value right from the start. The system flies!

Finding That Lost File

Soon after driving a hard disk with an operating system equipped with a hierarchical file system like OS-9, you'll be thrilled with the power and organizational capability. Later, when you've forgotten the ingenious idea behind the organization of your files, you see the liability of a hierarchical file system: "Let's see, did I store the recipe for fried eggs in the `FOOD` directory or did I store it in `BREAKFAST`?"

If you use a more powerful computer at work, it's easy to become spoiled. For example, when I can't remember where I stored a file on the Macintosh desktop publishing system at work, I go to the Apple menu and run a desk accessory named *Find File*, then give it the name. A few seconds later, it gives me the location of the file.

After manually searching for hundreds of files during the past several months, it was obvious that because of the proliferation of hard disk drives, a find file for Color Computer OS-9 is desperately needed.

There are two stand-alone utilities you can run from the OS-9 command line. Eventually, this core code may be incorporated into a menu-driven application run from *Multi-Vue*. The listing names for this month are: `Diskdir`, `Dodir`, `Findit`, `Find` and `Checkdir`.

The algorithm that makes it work can be studied in the listings `Checkdir` and `Dodir`. The other three listings contain code that drives `Checkdir` or `Dodir`.

You will need to `Pack` the five proce-

Dale L. Puckett, a freelance writer and programmer, serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. His username on Delphi is DALEP: on packet-radio, KOHYD @ N4QQ; on GEnie, D.PUCKETT2; and on CIS, 71446,736.

dures to your CMDS directory before execution. Some execution examples follow:

```
diskdir <ENTER>
diskdir /dd/com <ENTER>
```

If you exercise the first option above, *Diskdir* immediately begins to print a hierarchical listing of the directory of the default drive, `/dd`, to the Color Computer screen. If you have need for a hard copy, type: `diskdir >/p`, then press ENTER.

If you chose the optional command line, you can start your listing at a specified directory. For example, the command line above produces this listing:

```
PRO
 genie
 cis24
 delphi
 prostuff
 mac
SIGS
 CISmail
  abc
 GENIEmail
  def
 DELPHImail
  ghi
  kjl
 MACmail
  mno
  max9.ar
```

The utility *Findit* is an earlier version of *Find* that works like most programs coded with a BASIC interpreter. It prompts you for the information it needs. For example:

```
OS9: findit <ENTER>
Type a few characters from the name of
the file you need: max
Type the path to the directory you
would like to start in: /dd/com
max9.ar is in /DD/COM/SIGS/MACmail.
```

OS-9 users, on the other hand, want most of their programs to run in a unified manner. In general, they want to supply any needed parameters to a program on the command line. And they want to be able to redirect the output of the program to a file or any number of devices. The utility *Find* does this for you. Here are a few samples of *Find*'s command-line syntax:

```
find max /dd/com <ENTER>
max9.ar is in /DD/COM/SIGS/MACmail

find max <ENTER>
Type the path to the directory you
would like to start in: /dd/com/sigs
max9.ar is in /DD/COM/SIGS/MACmail

find <ENTER>
Type a few characters from the name of
the file you need: max
Type the path to the directory you
would like to start in: <ENTER>
icon.max is in /DD/CMDS/ICONS
max9 is in /DD/CMDS
max9.ar is in /DD/COM/SIGS/MACmail
maxdemo.vef is in /DD/DOCUMENTS
AIF.max is in /DD/TOOLS
```

Since we pressed the ENTER key in response to *Find*'s second question, it automatically started its search for the string `max` in the root directory of the default drive `/dd`. It found five files containing the string among the hundreds of files stored on the hard disk.

How They Work

Because of the process used to solve the *Find File* problem, these utilities will not break any speed records. For example, on a 20-megabyte hard disk containing 697 files, spread throughout 42 directories, in 13380 sectors, *Find* took approximately three minutes to locate four filenames. By comparison, the longest *Find File* search I've ever seen on a Macintosh II is 40 to 45 seconds.

On the up side, the Color Computer running OS-9 is a multitasking computer. This means you can start *Find* running in a Level II window, then press the CLEAR key over to another window and resume work on another article or program while *Find* is searching.

To turn *Find* and *Diskdir* into more ideal background utilities calls for a two-step addition, which I'll discuss next month. Needed first is a system call to get the process number of *Find* while it is running. Then a second system call sets the priority of that process just a bit below the majority of the other processes running on the computer. A word processor, for example, will have a higher priority and continue to operate smoothly while *Find* chugs along faithfully in the background. Every few minutes you can press the CLEAR key to toggle over to the other screen and see if *Find* has located the missing file.

Why It's Slower

The procedures `Checkdir` and `Dodir` are the core modules in finding missing files or printing hierarchical listings of files on hard disk. They use a technique known in programming circles as *recursion*. While this means that the code published this month is shorter than normal, at the same time debugging a recursive program can be quite time-consuming. Yet it will be very cost-effective in the future, in terms of time saved while looking for missing files.

Recursion is very memory-intensive in some programs; however, that problem has not yet been found with *Find* and *Diskdir*. In fact, the 8K workspace requested by *RunB* appears to be plenty for these two programs.

To write a program like *Find* or *Diskdir* requires a way to look at all the directories on a disk. Since directories are stored as simple files, part of the solution is easy — simply open the directory file and read it. Reading the file, you will learn the names of all the other files in the directory.

The catch is when you suddenly realize that this list of files most likely contains the names of other directories. But do you

OS9: SOFTWARE <D_P_Johnson >my_system >>no_errors #512K &

SDISK - Standard disk driver module replacement allows full use of 40 or 80 track double sided drives with OS-9 Level I. Full compatibility with CoCo 35 track format and access all other OS-9 non-CoCo formats. Easy installation. **$29.95**

SDISK+BOOTFIX - As above plus boot directly from a double sided diskette.**$35.95**

LEVEL 1 OS-9 ONLY

LEVEL 2 OS-9 ONLY

SDISK3 - Level II version of SDISK driver. Same features as level I (except bootfix not required to boot from double sided). **$29.95**

MSF - MS-DOS file manager. Complete file transfer capabiltites. **REQUIRES SDISK3 $45.00** or with SDISK3 for **$65.00**

L1 UTILITY PAK 40 utilities including MACGEN **$49.95**

L2 UTILITY PAK Level 2 Ram Disk and Printerr driver plus 10 more **$39.95** **BOTH L1+L2** Paks for **$75.00**

PC-XFER File transfer utilities read/write/format MS-DOS format disks under COCO OS-9, REQUIRES SDISK or SDISK3. **$45.00**

FORTH09 A FORTH-83 Standard implementation specially taylored for OS-9. Includes complete forth 6809 assembler and more. Programs written in forth can instantly be saved as compact executable machine language modules. Supplied with complete printed documentation. **$150.00** (+ $3 S&H) .

SEND S.A.S.E FOR LATEST CATALOG

All diskettes are in CoCo OS-9 format unless otherwise requested; other OS-9 formats can be supplied for $2.00 additional charge. All orders must be prepaid or COD, VISA/MC accepted, add $2 S&H for first software item, + .50 for each additional item, additional charge for COD.

D. P. Johnson, 7655 S.W. Cedarcrest St.
Portland, OR 97223 (503) 244-8152

(You may best reach us between 9AM-NOON Pacific Time, Mon.-Fri.)

OS-9 is a trademark of Microware and Motorola Inc., MS-DOS is a trademark of Microsoft, Inc., FORTH09 is a trademark of D. P. Johnson

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

WHAT TO WRITE: We are interested in what you may wish to tell our readers. We accept for consideration anything that is well-written and has a practical application for the Tandy Color Computer. If it interests you, it will probably interest lots of others. However, we vastly prefer articles with accompanying programs which can be entered and run. The more unique the idea, the more the appeal. We have a continuing need for short articles with short listings. These are especially appealing to our many beginners.

FORMAT: Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs and debug our typing errors. All programs should be supported by some editorial commentary explaining how the program works. We also prefer that editorial copy be included on the tape or disk using any of the word processors currently available for the Color Computer. Also, please include a double-spaced printout of your editorial material and program listing. Do not send text in all capital letters; use upper- and lowercase.

COMPENSATION: We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submission Guidelines, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit material currently submitted to another publication.

know if one of these files is a directory? Unfortunately, OS-9 does not mark its directory files as directories. In fact, each directory entry, file or directory is identical. It contains a string that can be up to 29 characters long, followed by a three-byte-long logical-sector address that tells the operating system where it is stored on the disk.

Because this entry does not contain information telling you it is a directory, you must open each file to check it. The classic approach, taken by OS-9 programmers writing hierarchical directory utilities, has been to open the file, point to the logical sector number, calculate the location of the file-attribute byte within the file itself, `seek` to that location and then go get that byte. If the attribute indicates the file is a directory, the programmer then opens it and proceeds to the next task.

The problem with this approach is that it uses a lot of processor time to perform math required to calculate the location of the byte containing the attribute. The code required looks something like this:

```
attr_ptr=dir_rec.byte3*65536.:dir_rec.byte2*256+dir
_rec.bytel
open #path, pathlist:read
seek #path, attr_ptr*256Get #path,
attr
Close #path
```

The calculations are no big deal if performed only occasionally. But when you perform them on each file of each disk (which can contain thousands of files) . . . you get the idea.

Our approach uses a bit of common sense and logic suggested by *WizPro* author Bill Brady. When he confronted the same problem while writing his `FMenu` routine within *WizPro*, he found if a file was a directory by attempting to change the current working directory to it. If he received an error from the system, he knew that he had tried to change the working directory to a file that is not a directory. If no error was received, it was a directory.

The core decision code in the programs looks like this:

```
3000 ON ERROR GOTO 3010
  en:=0
  CHD DirEntry
3010 en=ERR
  IF en = 0 THEN
    tempdir:="."
    DirLevel:=DirLevel+1
    RUN dodir(tempdir,DirLevel)
    CHD ".."
    DirLevel:=DirLevel-1
  ELSE \ It's a file !!!
  ENDIF
```

After resetting the error flag in the line following Line 3000, I attempted to change the directory to one with the name of the file just found. If it is a directory, the error code is zero and you can list its contents.

But before doing that, I increase the value of `DirLevel` by one. This value "pretty prints" the listing to show the level of the directory being listed.

How do you list the contents of a new directory? Simply run `Dodir` again. That's what is meant by *recursive*. It literally runs itself again when it needs to solve the problem at hand.

The Tricky Part

When you have a program that insists on running itself over and over again, you can wind up in deep trouble and quite confused if you don't tell it when to put the brakes on its inward attitude. This problem occurred early on because of the structure of an OS-9 directory.

If you open and read any OS-9 directory, you will always find two familiar names at the top of each list. Those entries are the parent and current directories and are not visible when running the OS-9 `Dir` utility command because the program skips them. However, when writing your own program to access a disk directory, you must take this into account. It is taken into account in just one line in the utilities *Checkdir* and *Dodir*:

```
IF DirEntry<>".." AND DirEntry<>"."
AND DirEntry<>"*" THEN
  PRINT TAB(DirLevel*5); DirEntry
GOSUB 3000 \ REM Is file a directory,
if so process it!
ENDIF
```

Essentially this line allows the printing of all filenames, except the parent and current directory, and anything marked with an asterisk (`*`). So what's this `*` all about?

The asterisk was the solution to a frustrating problem that ran our program around and around in circles until it was solved. The `*` is there because an OS-9 directory contains not only a listing of the name of each file it contains but also a listing of the name of every file ever held. This means that every file created and later deleted is still listed in an OS-9 directory.

Obviously you don't want these files listed. In addition, they drive the recursive logic in the program nuts. To understand what is going on, place a number of `PRINT` statements in your code to help debug it. At one point during development, I inserted five extra lines. My code looked like this:

```
PRINT "Returning from GoSub, adir is:
"; adir
```

```
IF adir THEN
   RUN readdir(target,tempdir)
   PRINT "After running readdir re-
cursively, adir is "; adir
CHD ".."
... etc

3000 ON ERROR GOTO 3010        en=0
   PRINT "We are looking at entry ";
Hits(EntryNum)
   PRINT "Our working directory be-
fore the CHD is ";
   Shell "pwd"
3010 en:=ERR
   PRINT "Our error number is "; en
   IF en=0 THEN \ REM It's a directory
   ... etc
```

When we ran this code, we received a printout like this:

```
Returning from GoSub, adir is False
Returning from GoSub, adir is False
We are looking at the entry B09
Our working directory before the CHD
is /HO/PROGS/B09
Our error number is 216
Returning from GoSub, adir is False
We are looking at the entry C
... etc.
```

Studying these lines tells you the course the program travels while it runs. When it doesn't show up where expected, you know to investigate. Eventually, I got to the bottom of things in this manner.

Two More Tricks

Two more questions deserve attention. First, how does BASIC09 handle parameter errors? The answer to this question is needed to make *Find* and *Dodir* act like OS-9 programs written in C or assembly language. Another question is how to kill the procedure smoothly after finding the file you are looking for. In the quest for these answers we also discovered a trick that tells which directory a file is located in and a way to remember the current data directory used when starting the program.

The answer to the parameter error handling is found by studying the code in Listing 1, `Find`. Here's the core:

```
ON ERROR GOTO 200
target:=temtarg
200 en=ERR
  IF en=56 THEN
       INPUT "Type ..."; target
  ENDIF
```

The key is that `target` is a `DIM`ensioned variable. However, `temtarg` is a parameter. If there is a Parameter Error (Error 56), then no memory has been allocated for it. This means that every time you access it in the program, the error signal appears. Because of this, you must set an error trap at each location where you plan to access a parameter to insure trapping the right one.

Killing a BASIC09 procedure smoothly is another interesting proposition. For example, the standard way for a user to abort from the program by pressing the BREAK key is to check for an Error Number 002, not 005 as you might think.

While 005 is the value of the BREAK key, it generates a Signal 2 that is fed back to BASIC09's error-trapping routine. You must look for the 002 error from the keyboard-abort-signal handler to get out of the program.

This raises another point where caution is required. When handling signals (i.e., a keyboard abort), you cannot debug the program from within BASIC09 itself. You must first pack the code and run it from the OS-9 Shell, where it will run under `RunB`. I first fell into this "gotcha" when working with mouse signals. But that was a year ago and it took me a while to figure out why the BREAK key was knocking me straight out of the program instead of following my error-trapping code. Beware.

To abort a procedure that runs by exercising other procedures (`Find` running `checkdir`, for example), you must supply a Boolean parameter that passes back and forth between one procedure and the next. I used a parameter named `killit`. When a procedure returns with `killit` true, it immediately ends, carrying the value of the `killit` to the procedure that called it. Eventually it gets back to the top level where I use the `Chd` command to move back to the current working directory, in which I started. Then I exit the program.

The Pwd Trick

It takes a while to find how to store the path to a directory so you can return to it later. The OS-9 utility will do the job of reporting a location on the screen. But that isn't much good if it doesn't tell the program itself.

Since the code in `pwd` itself is recursive and quite complicated, I again searched for an easier way,deciding to use a temporary file. With BASIC09's `Shell` statement, I called OS-9 and ran `pwd`. Its output was directed to a file named `wdirtemp` or `tempwdir`. Unique names are used in case you run both programs at the same time.

After writing the directory name to the disk file, the file opens and reads into an OS-9 variable. The `Chd` command is used then, with this variable as a parameter. If you happen to run a RAM disk and store it there, it's nice and fast.

Perhaps you'll find other tricks to help you with these deceptively simple listings. Next month I plan to put a menu-based front end on them and maybe add an alternative format. Till then, keep on hacking. ❑

PERRY COMPUTERS
The Ideal Buy
1-800-248-3823

TANDY COMPUTERS

Tandy 1000-HX 256K 5 1/4"D.	535.00
Tandy 1000-SL 384K 5 1/4"D.	675.00
Tandy 1000-TL 640K 3 1/2"D.	955.00
Tandy 3000-NL 512K 3 1/2"D.	1275.00
Tandy 4000-LX 2 Meg 3 1/2"D.	2999.00
Tandy 4000 1 Meg 3 1/2" D.	1890.00
Tandy 5000MC 2 Meg 1 Drive	3825.00
Tandy 5000MC 2 Meg 40 Meg	4955.00
Tandy 5000MC 2 Meg 84 Meg	5395.00
Tandy 1400LT 768K 2 Drives	1335.00
Tandy 102 24K	430.00
Tandy Color 3 128K	155.00

MONITORS & CARDS

VM-5 Monochrome Green	115.00
CM-5 Color RGB	220.00
CM-11 Color RGB	315.00
EGM-1 Color RGB (EGA)	510.00
Magnavox 9CM053 Color EGA	365.00
Packard Bell Monochrome TTL	89.00
NEC Multisync II Color	625.00
Tandy EGA Card	205.00
Paradise Basic EGA Card	195.00
Video 7 Vega/Deluxe	239.00

DRIVES

Color Computer Drive 0	225.00
5 1/4" External Drive 1000HX	180.00
Tandy 20 Meg Hardcard	450.00
30 Meg Hardcard	395.00
20 Meg Hard Drive 1400LT	775.00
5 1/4" External for Tandy 1400	215.00
Seagate 20 Meg Hard Drive	219.00
Tandy 1000/SX/TX Controller	69.00

MODEMS

Prac. Peripherals 1200B Internal	75.00
Prac. Peripherals 2400B Internal	175.00
Packard Bell 2400B Internal	140.00

PRINTERS

DMP-106 Dot-Matrix	165.00
DMP-132 Dot-Matrix	285.00
DWP-230 Daisy Wheel	345.00
Epson LX-800 Dot-Matrix	189.00
Epson FX-850 Dot-Matrix	375.00
Epson LQ-500 Dot-Matrix	315.00
Epson FX-1050 Dot-Matrix	489.00
Panaonic KX-P1180 Dot-Matrix	195.00
Panasonic KX-P1191 Dot-Matrix	260.00
Panasonic KX-P1124 Dot-Matrix	369.00

Please write for complete price list.
We carry more items than listed here.

All prices and offers may be changed or withdrawn without notice. Advertised prices are cash prices. C.O.D. accepted add 2% (minimum charge $10.00). M.C., Visa add 2%. All non defective items require return merchandise authorization. Call for RMA Number before returning. Delivery is subject to product availability. Add 1½% for shipping and handling, $5.00 minimum charge.

TM - Registered Trademark of Tandy, Epson, and IBM

Monday thru Friday 9am - 5pm EST.

PERRY COMPUTERS

124 South Main Street, Perry, MI 48872
CALL 1-517-625-4161 or TOLL-FREE
1-800-248-3823

About Your Subscription

Your copy of THE RAINBOW is sent second class mail. You must notify us of a new address when you move. Notification should reach us no later than the 15th of the month prior to the month in which you change your address. Sorry, we cannot be responsible for sending another copy when you fail to notify us.

Your mailing label also shows an account number and the subscription expiration date. Please indicate this account number when renewing or corresponding with us. It will help us help you better and faster.

For Canadian and other non-U.S. subscribers, there may be a mailing address shown that is different from our editorial office address. Do not send any correspondence to that mailing address. Send it to our editorial offices at Falsoft, Inc., The Falsoft Building, P.O. Box 385, Prospect, KY 40059. This applies to everyone *except* those whose subscriptions are through our distributor in Australia.

Listing 1: `Find`

```
PROCEDURE find
 0000          PARAM temtarg,tempath:STRING
 000B          DIM target,pathname:STRING
 0016          DIM savewdir,test:STRING
 0021          DIM path,en:BYTE
 002C          DIM killit:BOOLEAN
 0033
 0034          ON ERROR GOTO 100
 003A
 003B          killit:=FALSE
 0041          en:=0
 0048
 0049          SHELL "pwd > /dd/wdirtemp"
 005F
 0060 100      IF en=218 THEN
 006F            SHELL "del /dd/wdirtemp"
 0083            SHELL "pwd > /dd/wdirtemp"
 0099          ENDIF
 009B
 009C          OPEN #path,"/dd/wdirtemp"
 00B1          GET #path,savewdir
 00BB          CLOSE #path
 00C1
 00C2          ON ERROR GOTO 200
 00C8
 00C9          target:=temtarg
 00D1
 00D2 200      en=ERR
 00DB          IF en=2 THEN
 00E7            GOTO 400
 00EB          ENDIF
 00ED
 00EE          IF en=56 THEN
 00FA            INPUT "Type a few characters from the name of the file you need: "
                 ,target
 013C          ENDIF
 013E
 013F          ON ERROR GOTO 300
 0145
 0146          pathname:=tempath
 014E
 014F 300      en=ERR
 0158          IF en=2 THEN
 0164            GOTO 400
 0168          ENDIF
 016A
 016B          IF en=56 THEN
 0177            INPUT "Type the path to the directory you would like to start in: "
                 ,pathname
 01BA            IF pathname="" THEN
 01C6              pathname:="/dd"
 01D0            ENDIF
 01D2          ENDIF
 01D4
 01D5          RUN checkdir(target,pathname,killit)
 01E9
 01EA 400      CHD savewdir
 01F2          SHELL "del /dd/wdirtemp"
 0206          END
 0208
 0209
```

Listing 2: `Findit`

```
PROCEDURE findit
 0000          DIM target,pathname:STRING
 000B          DIM savewdir,test:STRING
 0016          DIM path,en:BYTE
 0021          DIM killit:BOOLEAN
 0028
 0029          ON ERROR GOTO 100
 002F
```

```
0030      SHELL "pwd > /dd/wdirtemp"
0046
0047 100  IF en=218 THEN
0056        SHELL "del /dd/wdirtemp"
006A        SHELL "pwd >/dd/wdirtemp"
007F      ENDIF
0081
0082      OPEN #path,"/dd/wdirtemp"
0097      GET #path,savewdir
00A1      CLOSE #path
00A7
00A8      ON ERROR GOTO 200
00AE
00AF      INPUT "Type a few characters from the name of the file you need: "

           ,target
00F1      INPUT "Type the path to the directory you would like to start in: "

           ,pathname
0134
0135      IF pathname="" THEN
0141        pathname:="/dd"
014B      ENDIF
014D
014E      RUN checkdir(target,pathname,killit)
0162
0163 200  CHD savewdir
016B      SHELL "del /dd/wdirtemp"
017F      END
0181
0182
0183
```

Listing 3: Diskdir

```
PROCEDURE diskdir
 0000      PARAM temstartdir:STRING
 0007      DIM savewdir,pathname:STRING
 0012      DIM path,DirLevel:BYTE
 001D      DIM killit:BOOLEAN
 0024
 0025      ON ERROR GOTO 100
 002B      en:=0
 0033      killit:=FALSE
 0039
 003A      SHELL "pwd >/dd/tempwdir"
 004F
 0050 100  IF en=218 THEN
 0060        SHELL "del /dd/tempwdir"
 0074        SHELL "pwd >/dd/tempwdir"
 0089      ENDIF
 008B
 008C      OPEN #path,"/dd/tempwdir":READ
 00A3      GET #path,savewdir
 00AD      CLOSE #path
 00B3
 00B4      ON ERROR GOTO 200
 00BA
 00BB      pathname:=temstartdir
 00C3
 00C4 200  en=ERR
 00CE      IF en=56 THEN
 00DB        pathname:="/dd"
 00E5      ENDIF
 00E7
 00E8      ON ERROR GOTO 300
 00EE
 00EF      DirLevel:=0
 00F6
 00F7      RUN dodir(pathname,DirLevel,killit)
 010B
 010C 300  CHD savewdir
 0114      SHELL "del /dd/tempwdir"
 0128      END
 012A
```

MORE BAUD
LESS BUCKS

Save Time and Money with a Surprisingly Affordable 2400/1200/300 BPS Hayes - Compatible Modem for any Computer.

Don't be fooled by the low cost of these 2400 baud modems. These are high quality modems made in the USA, with performance features unmatched by competitors costing three times as much.

This is full-featured Hayes compatible modem that works with any computer. It features superior Hayes compatibility, advanced digital signal processing, and adaptive equalization for great performance and reliability. All of this in a compact, attractive go-anywhere package that's not not much larger than a paperback book.

Convenience features like call progress tone detection, auto-dial and auto-answer, a call progress speaker with volume control, a second jack for a local phone, on board diagnostics.

Money saving premiums for sign-up and connect time for Delphi, The Source, CompuServ, etc. Software available: ProcComm (PC) + 5; QuickLink (Mac) + 5; WizPro is free (shareware).

Backed by two year mfg. warrantee, so you can buy with confidence that comes with 11 years of telecommunication experience.

2400/1200/300 BPS modem $125.00

(Please add 2.50 shipping and handling)
Dealer inquiries welcome.

GCS FILE TRANSFER UTILITIES

See: Review - December Rainbow.
Dale Puckett - November Rainbow.

The **GCS File Transfer Utilities** provide a simple and quick method to transfer text and binary files from and to a variety of floppy disk formats.

Just place the **PC (MSDOS), RSDOS, FLEX** or **MINI-FLEX** disk into your disk drive - enter a simple command and the file is copied into a **OS-9** file. File transfer back is just as simple. Under Multi-Vue version, just select command from one of three menus.

Commands **Dir** of PC, RS or FLEX disk
Dump disk sector of PC, RS or FLEX
Read file from PC, RS or FLEX disk
Write file to PC, RS or FLEX disk
Rename file on PC disk
Delete file from PC disk
Format PC disk

Extensive Options Single, Double sided disks.
Single, double density disks.
35, 40 or 80 track floppy drives.
8 or 9 sectors (PC).
First level sub-directories (PC).
Binary files. Use pipes for direct and multiple transfers.

Requires OS-9. 2 drives (one can be hard or ramdisk - one floppy 40 T DD DS).
Multi-Vue for Multi-Vue version.
SDISK (SDISK3 for COCO III).

GCS File Transfer Utilities for CoCo

Multi-Vue version $54.95
Standard version $44.95
SDISK or SDISK3 $29.95

Standard diskettes are OS-9 format (5.25") add $2.50 for 3.5". Orders must be prepaid or COD. VISA/MC. Add $1.75 S&H, COD is additional.

GRANITE COMPUTER SYSTEMS
Route 2 Box 445 Hillsboro, NH 03244
(603) 464-3850

OS-9 is a trademark of Microware Systems Corporation and Motorola Inc. MS-DOS is a trademark of Microsoft Corp. FLEX is a trademark of TSC, Inc.

About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette or disk) to:

THE RAINBOW
One-Liner Contest
P.O. Box 385
Prospect, KY 40059

Listing 4: Checkdir

```
PROCEDURE checkdir
 0000        PARAM target,pathname:STRING; killit:BOOLEAN
 0011        TYPE record=fname(29):BYTE; lsn3,lsn2,lsn1:BYTE
 002F        DIM fmentry:record
 0038        DIM DirEntry:STRING[29]
 0044        DIM index,CharCount:INTEGER
 004F        DIM en,DirPath:BYTE
 005A        DIM tempdir:STRING
 0061        DIM adir:BOOLEAN
 0068
 0069        ON ERROR GOTO 3010
 006F
 0070        IF killit THEN END
 007A        ENDIF
 007C
 007D        index=0
 0084        en:=0
 008B
 008C        CHD pathname
 0091        OPEN #DirPath,pathname:READ+DIR
 009D        SEEK #DirPath,0
 00A6
 00A7        REPEAT
 00A9
 00AA          IF killit THEN END
 00B4          ENDIF
 00B6
 00B7          SEEK #DirPath,index \ GET #DirPath,fmentry
 00CB          IF fmentry.fname(1)=0 THEN
 00DC            DirEntry:="*"
 00E4          ELSE
 00E8            CharCount:=0
 00EF            DirEntry=""
 00F6
 00F7            REPEAT
 00F9              CharCount=CharCount+1
 0104              DirEntry=DirEntry+CHR$(LAND(fmentry.fname(CharCount),

                    127))
 011A            UNTIL fmentry.fname(CharCount)>127 OR CharCount=28
 0132            DirEntry:=DirEntry+""
 013D          ENDIF
 013F
 0140          IF DirEntry<>".." AND DirEntry<>"." AND DirEntry<>"*" THEN


 015E            IF SUBSTR(target,DirEntry)<>0 THEN
 016E              PRINT DirEntry; " is in ";
 017E              SHELL "pwd"
 0185            ENDIF
 0187            GOSUB 3000
 018B            REM Is file a directory?  If so, process it !"
 01B8          ENDIF
 01BA          index:=index+32
 01C5        UNTIL EOF(#DirPath)
 01CE        CLOSE #DirPath
 01D4        END
 01D6
 01D7 3000   ON ERROR GOTO 3010
 01E0        en:=0
 01E7        CHD DirEntry
 01EC
 01ED 3010   en:=ERR
 01F6
 01F7        IF en=2 THEN
 0203          killit:=TRUE
 0209          END
 020B        ENDIF
 020D
 020E        IF en=0 THEN  \REM It's a directory
 022D          tempdir:="."
 0235          RUN checkdir(target,tempdir,killit)
 0249          CHD ".."
 024F        ELSE  \REM It's a file
 0261        ENDIF
 0263        RETURN
 0265
```

Listing 5: `Dodir`

```
PROCEDURE dodir
 0000      PARAM pathname:STRING; DirLevel:BYTE; killit:BOOLEAN
 0013      TYPE record=fname(29):BYTE; lsn3,lsn2,lsn1:BYTE
 0031      DIM fmentry:record
 003A      DIM DirEntry:STRING[29].
 0046      DIM index,CharCount:INTEGER
 0051      DIM en,DirPath:BYTE
 005C      DIM tempdir:STRING
 0063
 0064      ON ERROR GOTO 3010
 006A
 006B      IF killit THEN END
 0075      ENDIF
 0077
 0078      en:=0
 007F      index=0
 0086
 0087      CHD pathname
 008C      OPEN #DirPath,pathname:READ+DIR
 0098      SEEK #DirPath,0
 00A1
 00A2      REPEAT
 00A4
 00A5        IF killit THEN END
 00AF        ENDIF
 00B1
 00B2        SEEK #DirPath,index \ GET #DirPath,fmentry
 00C6        IF fmentry.fname(1)=0 THEN
 00D7          DirEntry:="*"
 00DF        ELSE
 00E3          CharCount:=0
 00EA          DirEntry=""
 00F1
 00F2          REPEAT
 00F4            CharCount=CharCount+1
 00FF            DirEntry=DirEntry+CHR$(LAND(fmentry.fname(CharCount),

                   127))
 0115          UNTIL fmentry.fname(CharCount)>127 OR CharCount=28
 012D          DirEntry:=DirEntry+""
 0138        ENDIF
 013A
 013B        IF DirEntry<>".." AND DirEntry<>"." AND DirEntry<>"*" THEN


 0159          PRINT TAB(DirLevel*5); DirEntry
 0166          GOSUB 3000
 016A
 016B          REM Is file a directory?  If so, process it
 0195        ENDIF
 0197
 0198        index:=index+32
 01A3      UNTIL EOF(#DirPath)
 01AC
 01AD      CLOSE #DirPath
 01B3      PRINT  \ PRINT  \ PRINT
 01B9      END
 01BB
 01BC 3000 ON ERROR GOTO 3010
 01C5      en:=0
 01CC      CHD DirEntry
 01D1
 01D2 3010 en:=ERR
 01DB
 01DC      IF en=2 THEN
 01E8        killit:=TRUE
 01EE        END
 01F0      ENDIF
 01F2
 01F3      IF en=0 THEN  \REM It's a directory
 0212        tempdir:="."
 021A        DirLevel:=DirLevel+1
 0225        RUN dodir(tempdir,DirLevel,killit)
 0239        CHD ".."
 023F        DirLevel:=DirLevel-1
 024A      ELSE  \REM It's a file
 025C      ENDIF
 025E      RETURN
 0260
```

SUMMER SPECIALS FROM SPORTSware

WARGAME DESIGNER II

Design your own icons for units and terrain features. Design your own maps. Assign each unit it's own unique attributes. Play war games YOU designed! Keyboard or joystick control, game save and more!

INVASION NORTH, ATTACK ON MOSCOW, R.O.T.C. AND FORT APACHE scenarios included. Ready to play! 4 disk sides of fun!
NOW ONLY $24

WGD II ICON DISK #1

528 ready to use unit & terrain icons. A MUST HAVE WGD II accessory. Superb graphics! Just $14

GRIDIRON STRATEGY

Get ready for the BEST 1 & 2 player game of football around. The most realistic football simulation for the COCO3! Only $17

WEEKLY WINNER 2.0

Just "playing" the lottery? Get serious and start WINNING! We've seen WW2.0 hit 4 & 5 of 6 in Ohio. Play 3, 4 and 6 digit lottos. Fast, easy to use ML program. Invest in your future NOW! $15

NEW! CATALOG ON DISK

Seeing is believing! Send just $3 for our NEW Catalog On Disk. Then deduct $3 from the cost of your next order! Many NEW products illustrated! Order Yours Today!

CC3 FLAGS

If you like Parker Bros. RISK, you'll love CC3FLAGS. A game of world conquest for 1 to 6 players. Great graphics and definitely addictive!
SUMMER SALE $19

COCO3 WHEEL

Recently updated! 200 puzzles (and you can add MORE). Play your favorite game show at home! 1 to 6 can play. NOW $19

BLACK GRID

An intriguing puzzle for the COCO3. "You'll be pulling your hair out with this one." JUST $19

NEW! PENINSULAR WAR

You command the British Forces in Spain 1805. This historic simulation puts you in Wellington's shoes against superior French forces during the Napoleonic War. ONLY $19

NEW! THE RUSSIAN CAMPAIGN

Another REALISTIC campaign from the days of Napoleon. Can you defeat the Russian army and capture Moscow? JUST $19

NEW! BIG SCREEN

Add another 8K to COCO3's HIRES Graphics Screens. Scroll up & down. 33 lines of text. All BASIC! Just add this subroutine to existing or new BASIC programs. A BASIC programmers utility!
ONLY $12

CC3 CRAM

Save most COCO3 graphic screens to disk in 6 or less granules, not 16! JUST $12

VISA & MASTERCARD accepted. FREE SHIPPING **GET GHOST HUNTERS FREE with ANY ORDER**
A $15 Value! Catalog orders excluded.

SPORTSware
1251 S. Reynolds Road, Suite 414
Toledo, Ohio 43615
(419) 389-1515

These Fine Stores Carry THE RAINBOW

The retail stores listed below carry THE RAINBOW on a regular basis and may have other products of interest to Tandy Color Computer users. We suggest you patronize those in your area.

ALABAMA

Birmingham	Jefferson News Co.
Brewton	McDowell Electronics
Florence	Anderson News Co.
Greenville	M & B Electronics
Madison	Madison Books
Montgomery	Trade 'N' Books
Tuscaloosa	Injun John's, Inc.

ALASKA

Fairbanks	Arrow Appliance/Radio Shack

ARIZONA

Cottonwood	A & W Graphics Co.
Lake Havasu City	Book Nook
Phoenix	TRI-TEK Computers
Tempe	Books, Etc.
	Computer Library
Tucson	Anderson News Co.

ARKANSAS

Fayetteville	Vaughn Electronics/Radio Shack
Ft. Smith	Hot Off the Press Newsstand
Little Rock	Anderson News Co.

CALIFORNIA

Berkeley	Lyon Enterprises
Citrus Heights	Software Plus
Hollywood	Levity Distributors
	Stef-Jen, Inc.
La Jolla	Butler & Mayes Booksellers
Los Angeles	Circus of Books (2 Locations)
Marysville	Bookland
Napa	Bookends Bookstore
Oakland	DeLauer's News Agency
Rancho Murieta	Software Plus
Sacramento	Deibert's Readerama
	Tower Magazine
San Francisco	Booksmith
	Bookworks
	Castro Kiosk
Santa Monica	Midnight Special Bookstore
San Jose	Computer Literacy Bookshops
Santa Rosa	Sawyer's News, Inc.
Stockton	Harding Way News
	Paperbacks Unlimited
Sunnyvale	Computer Literacy
Torrance	El Camino College Bookstore

COLORADO

Aurora	Aurora Newsstand
Colorado Springs	Hathaway's
Denver	News Gallery
Glenwood Springs	The Book Train
Grand Junction	Readmore Book & Magazine
Longmont	City Newsstand

DELAWARE

Newark	Newark Newsstand
Wilmington	Normar, Inc.—The Smoke Shop

DISTRICT OF COLUMBIA

Washington, DC	Chronichles
	News Room
	World News, Inc.

FLORIDA

Boca Raton	Great American Book Co.
Clearwater	The Avid Reader
Dania	Dania News & Books
Davie	Software Plus More
Ft. Lauderdale	Bob's News & Book-Store
	Clarks Out of Town News
Gainesville	Paper Chase
Jacksonville	Book Co.
Merritt Island	The Open Door
North Miami Beach	Almar Bookstore
Panama City	Boyd-Ebert Corp.
Pensacola	Anderson News Co.
Pinellas Park	Wolf's Newsstand
South Pasadena	Poling Place Bookstore
Starke	Record Junction, Inc.
	Radio Shack Dealer
Sunrise	Sunny's at Sunset
Tallahassee	Anderson News Co.
	DuBey's News Center

FLORIDA (cont'd)

Titusville	Computrac

GEORGIA

Atlanta	Border's
Bremen	Bremen Electronics/Radio Shack
Forest Park	Ellers News Center
Jesup	Radio Shack
Thomasville	Smokehouse Newsstand
Toccoa	Martin Music Radio Shack

IDAHO

Boise	Book Shelf, Inc.
Moscow	Johnson News Agency

ILLINOIS

Belleville	Software or Systems
Centralia	Books & Co., Inc.
Champaign	Bookmark
Chicago	B. Dalton Booksellers
Decatur	Book Emporium
	K-Mart Plaza
	Northgate Mall
East Moline	Book Emporium
Evanston	Norris Center Bookstore
Kewanee	Book Emporium
Lisle	Book Nook
Lombard	Empire Periodicals
Newton	Bill's TV Radio Shack
Paris	Book Emporium
Peoria	Book Emporium
	Sheridan Village
	Westlake Shopping Center
	Illinois News Service
Springfield	Book Emporium
	Sangamon Center North
	Town & Country Shopping Ctr.
Sunnyland	Book Emporium
West Frankfort	Paper Place
Wheeling	North Shore Distributors

INDIANA

Angola	D & D Electronics
	Radio Shack
Berne	White Cottage Electronics
Bloomington	Book Corner
Crawfordsville	Koch's Books
Dyer	Miles Books
Franklin	Gallery Book Shop
Ft. Wayne	Michiana News Service
Garrett	Finn News Agency, Inc.
Indianapolis	Bookland, Inc.
	Borders Bookshop
	Indiana News
	Southside News
Lebanon	Gallery Book Shop
Martinsville	Radio Shack
Richmond	Voyles News Agency, Inc.

IOWA

Davenport	Interstate Book Store
Des Moines	Thackery's Books, Inc.
Fairfield	Kramers Books & Gifts

KANSAS

Hutchinson	Crossroads, Inc.
Topeka	Palmer News, Inc.
	Town Crier of Topeka, Inc.
Wellington	Dandy's/Radio Shack Dealer
Wichita	Lloyd's Radio

KENTUCKY

Hazard	Daniel Boone Gulf Mart
Henderson	Matt's News & Gifts
Hopkinsville	Hobby Shop
Louisville	Hawley-Cooke Booksellers (2 Locations)
Middletown	Software City
Newport	Simon's Castle News

LOUISIANA

Baton Rouge	City News Stand
Lockport	TV Doctor/Radio Shack
New Orleans	Sidney's News Stand Uptown
Monroe	The Book Rack

MAINE

Bangor	Magazines, Inc.
Brockton	Voyager Bookstore
Caribou	Radio Shack
Oxford	Books-N-Things
Sanford	Radio Shack

MARYLAND

College Park	University Bookstore

MASSACHUSETTS

Boston	Eastern Newsstand
Brockton	Voyager Bookstore
Cambridge	Out Of Town News
Ipswich	Ipswich News
Littleton	Computer Plus
Lynn	North Shore News Co.
Swansea	Newsbreak, Inc.

MICHIGAN

Allen Park	Book Nook, Inc.
Birmingham	Border's Book Shop
Durand	Robbins Electronics
E. Detroit	Merit Book Center
Hillsdale	Electronics Express/Radio Shack
Holland	Fris News Company
Kalamazoo	The Book Raft
Lowell	Lowell Electronics
Muskegon	The Eight Bit Corner
Niles	Michiana News Service
Perry	Perry Computers
Riverview	Riverview Book Store
Roseville	New Horizons Book Shop

MINNESOTA

Burnsville	Shinder's Burnsville
Crystal	Shinder's Crystal Gallery
Edina	Shinder's Leisure Lane
Minneapolis	Shinder's (2 Locations)
Minnetonka	Shinder's Ridge Squcre
Roseville	Shinder's Roseville
St. Paul	Shinder's Annex
	Shinder's Maplewood
	Shinder's St. Pauls
Willmar	The Photo Shop

MISSOURI

Farmington	Ray's TV & Radio Shack
Flat River	Ray's TV & Radio Shack
Florissant	Book Brokers Unlimited
Jefferson City	Cowley Distributing
Kirksville	T&R Electronics
St. Louis	Book Emporium

MONTANA

Butte	Plaza Books

NEBRASKA

Lincoln	Nebraska Bookstore
Omaha	Nelson News

NEVADA

Carson City	Bookcellar
Las Vegas	Hurley Electronics
	Steve's Books & Magazines

NEW HAMPSHIRE

Manchester	Bookwrights
West Lebanon	Verham News Corp.

NEW JERSEY

Atlantic City	Atlantic City News Agency
Cedar Knolls	Village Computer & Software
Clinton	Micro World II

NEW MEXICO

Albuquerque	Page One Newsstand
Santa Fe	Downtown Subscription

NEW YORK

Amherst	Village Green-Buffalo Books
Brockport	Lift Bridge Book Shop, Inc.
Brooklyn	Cromland, Inc.
Elmira Heights	Southern Tier News Co., Inc.
Fredonia	On Line: Computer Access Center
Hudson Falls	G.A. West & Co.
Huntington	Oscar's Bookshop
Johnson City	Unicorn Electronics
New York	Barnes & Noble—Sales Annex
	Coliseum Books
	Eastern Newsstand
	Grand Central Station, Track 37
	200 Park Ave., (Pan Am #1)
	55 Water Street
	World Trade Center #2
	First Stop News
	Idle Hours Bookstore
	International Smoke Shop
	Jonil Smoke
	Penn Book
	State News
	Walden Books
	World Wide Media Services
Rochester	Microcom Software
	Village Green
	World Wide News

NORTH CAROLINA

Cary	News Center in Cary Village
Chapel Hill	University News & Sundry
Charlotte	Newsstand Int'l
Hickory	C² Books & Comics
Jacksonville	Michele's, Inc.
Kernersville	K & S Newsstand
Lexington	Martin's News Stand
Marion	Boomers Rhythm Center
Winston-Salem	K & S Newsstand (3 Locations)
	Rainbow News Ltd.

OHIO

Akron	Churchill News & Tobacco
Canton	Little Professor Book Center
Chardon	Thrasher Radio & TV
Cincinnati	Cinsoft
Cleveland	Erieview News
Columbiana	Fidelity Sound & Electronics
Columbus	B5 Software
	Micro Center
	The Newsstand
Dayton	Books & Co.
	Wilke News
	Wright News & Books
Dublin	Book Barn
Fairborn	News-Readers
	Sandbox Micro Systems
	Wilke's University Shoppe
Findley	Open Book
Lakewood	Lakewood International News
Lima	Edu-Caterers
Miamisburg	Wilke News
Parma	Bookmark Newscenter
Warren	Book Nook, Inc.
Xenia	Fine Print Books
Youngstown	Plaza Book & Smoke Shop

OKLAHOMA

Oklahoma City	Merit Micro Software
Taklequah	Thomas Sales, Inc. dba Radio Shack
Tulsa	Steve's Book Store

OREGON

Eugene	Libra Books — Book Mark
Portland	Fifth Avenue News
	Rich Cigar Store, Inc.
	Sixth & Washington News
Salem	Capitol News Center
	Checkmate Book

PENNSYLVANIA

Allentown	Owl Services
Altoona	Newborn Enterprises
Bryn Mawr	Bryn Mawr News
Feasterville	Global Books
King of Prussia	Gene's Books
Malvern	Personal Software
Reading	Smith's News & Card Center
Temple	Software Corner
West Chester	Chester County Book Co.
Wind Gap	Micro World
York	The Computer Center of York
	Tollgate Bookstore

RHODE ISLAND

Newport	Bellevue News

SOUTH CAROLINA

Charleston Hts.	Software Haus, Inc.
Clemson	Clemson Newsstand
Florence	Ray's #1
Greenville	Palmetto News Co.
Spartanburg	Software City

TENNESSEE

Brentwood	Bookworld #5
Chattanooga	Anderson News Co.
	Guild Books & Periodicals
Knoxville	Anderson News Co.
	Davis-Kidd Bookseller
Memphis	Computer Center
Nashville	Davis-Kidd Booksellers
	Mosko's Place
	R.M. Mills Bookstore
Smyrna	Delker Electronics

TEXAS

Big Spring	Poncho's News
Desoto	Maxwell Books
Elgin	The Homing Pigeon
Ft. Worth	Trinity News
Harlington	Book Mark

UTAH

Provo	Valley Book Center

VIRGINIA

Danville	K & S Newsstand
Hampton	Benders
Lynchburg	Self Serve Software
Norfolk	I-O Computers
	Turn The Page
Richmond	Volume I Bookstore

WASHINGTON

Port Angeles	Port Book & News
Seattle	Adams News Co., Inc.
	Bulldog News
Tacoma	B & I Magazines & Books
	Nybbles 'N Bytes

WEST VIRGINIA

Huntington	Nick's News
Madison	Communications, LTD
Parkersburg	Valley News Service
South Charleston	Spring Hill News

WISCONSIN

Appleton	Badger Periodicals
Cudahy	Cudahy News & Hobby
Kenosha	R.K. News, Inc.
Madison	Pic A Book
	University Bookstore
Milwaukee	Juneau Village Reader
Waukesha	Holt Variety

ARGENTINA

Cordoba	Information Telecommunicationes

AUSTRALIA

Blaxland	Blaxland Computers
Kingsford	Paris Radio Electronics

CANADA:
ALBERTA

Banff	Banff Radio Shack
Bonnyville	Paul Tercier
Brooks	Double "D" A.S.C. Radio Shack
Calgary	Billy's News
Claresholm	Radio Shack Associated Stores
Drayton Valley	Langard Electronics
Edmonton	CMD Micro
Fairview	D.N.R. Furniture & TV
Fox Creek	Fox City Color & Sound A.S.C. Radio Shack
Ft. Saskatchewan	Ft. Mall Radio Shack, ASC
Grande Cache	The Stereo Hut
Grande Centre	The Book Nook
Hinton	Jim Cooper
Innisfail	L & S Stereo
Leduc	Radio Shack Associated Stores
Lethbridge	Datatron
Lloydminster	Lloyd Radio Shack
Okotoks	Okotoks Radio Shack
Peace River	Radio Shack Associated Stores
	Tavener Software
St. Paul	Walter's Electronics
Stettler	Stettler Radio Shack
Strathmore	Wheatland Electronics
Taber	Pynewood Sight & Sound
Westlock	Westlock Stereo
Wetaskiwin	Radio Shack

BRITISH COLUMBIA

Burnaby	Compulit
Burns Lake	VT. Video Works
Campbell River	TRS Electronics
Chilliwack	Charles Parker

BRITISH COLUMBIA (cont'd)

Coquitlam	Cody Books LTD
Coortenay	Rick's Music & Stereo
Dawson Creek	Bell Radio & TV
Golden	Taks Home Furnishings
Langley	Langley Radio Shack
Nelson	Oliver's Books
New Westminster	Cody Books LTD
Parksville	Parksville TV
Penticton	D.J.'s
	Four Corner Grocery
Sidney	Sidney Electronics
Smithers	Wall's Home Furniture
Squamish	Kotyk Electronics
Vancouver	Active Components
	Friendlyware Computers
	Granville Book Co.
	Siliconnections Books LTD
100 Mile House	Tip Top Radio & TV

MANITOBA

Altona	L.A. Wiebr Ltd.
Lundar	Goranson Elec.
Morden	Central Sound
The Pas	Jodi's Sight & Sound
Selkirk	G.L. Enns Elec.
Virden	Archer Enterprises

NEW BRUNSWICK

Moncton	Jeffries Enterprises
Sussex	Dewitt Elec.

NEWFOUNDLAND

Botwood	Seaport Elec.
Carbonear	Slade Realties
Labrador City	N.P. Investments (Mall Drugs)

NOVA SCOTIA

Halifax	Atlantic News

ONTARIO

Angus	Micro Computer Services
Aurora	Compu Vision
Concord	Ingram Software
Exceter	J. Macleane & Sons
Hanover	Modern Appliance Centre
Huntsville	Huntsville Elec.
Kenora	Donny "B"
Kingston	T.M. Computers
Listowel	Modern Appliance Centre
South River	Max TV
	Dennis TV
Toronto	Gordon and Gotch

QUEBEC

LaSalle	Messageries de Presse Benjamin Enr.
Pont. Rouge	Boutique Bruno Laroche

SASKATCHEWAN

Assiniboia	Telstar News
Estevan	Kotyk Electronics
Moose Jaw	D&S Computer Place
Nipiwan	Cornerstone Sound
Regina	Regina CoCo Club
	Software Supermarket
Saskatoon	Everybody's Software Library
Shellbrooke	Gec. Laberge Radio Shack
Tisdale	Paul's Service
Unity	Grant's House of Sound

YUKON

Whitehorse	H & O Holdings

JAPAN

Tokyo	America Ado, Inc.

PUERTO RICO

East Isla Verde	The Color Computer Store

Also available at all B. Dalton Booksellers, and selected Coles and W.H. Smith in Canada, Waldenbooks, Pickwick Books, Encore Books, Barnes & Noble, Little Professors, Tower Book & Records, Kroch's & Brentano's, and Community Newscenters.

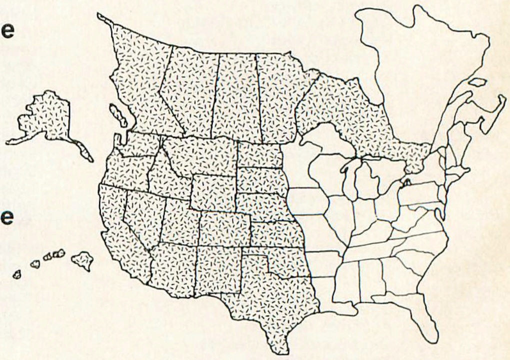
Advertisers Index

We encourage you to patronize our advertisers — all of whom support the Tandy Color Computer. We will appreciate your mentioning* THE RAINBOW *when you contact these firms.

Alpha Software Technologies . . . 81
Arizona Small Computer Company . . . 143
Burke & Burke . . . 35
CRC/Disto . . . 146
Cer-Comp . . . 97
Cinsoft . . . 81
CoCo Connection . . . 45
Cognitec . . . 29
Colorware . . . 19
Computer Island . . . 75
Computer Plus . . . 3
D.P. Johnson . . . 151
Danosoft . . . 51
Dayton Associates of W. R. Hall, Inc. . . . 131
Delphi . . . 86
Dr. Preble's Programs . . . 23
EZ Friendly . . . 49
Frank Hogg Laboratories . . . 33
Game Point Software . . . 67, 119
Gimmesoft . . . 21
Granite Computer Systems . . . 155
HawkSoft, Inc. . . . 149
Howard Medical . . . 162, IBC
JR & JR Softstuff . . . 60
JWT Enterprises . . . 115
Ken-Ton Electronics . . . 145
Magus Systems Engineering . . . 49
Metric Industries . . . 14
MichTron . . . BC
Microcom Software . . . 7, 9, 11, 13, 15, 17
Microtech Consultants Inc. . . . 77
NRI Schools . . . Insert
Orion Technologies . . . 53
Owl-Ware . . . 69, 70, 71
Perry Computers . . . 153
Questron . . . 75
RGB Computer System . . . 145
Rainbow Binder . . . 64
Rainbow on Tape & Disk . . . IFC
Rulaford Research . . . 129
SD Enterprises . . . 25, 141
Second City Software . . . 161
Simply Better Software . . . 37
SPORTSware . . . 157
Sugar Software . . . 57
Sundog Systems . . . 39
T & D Software . . . 31, 106, 107, 124
Tandy/Radio Shack . . . 125
Tepco . . . 123
Tothian Software . . . 133
True Data Products . . . 83
Try-O-Byte . . . 61
Vidicom . . . 47
Zebra Systems . . . 103

▨ **Call:**
Belinda Kirby
Advertising Representative
(502) 228-4497

☐ **Call:**
Kim Vincent
Advertising Representative
(502) 228-4492



The Falsoft Building
9509 U.S. Highway 42
P.O. Box 385
Prospect, KY 40059

FAX (502) 228-5121

BSE: $19.95
Basic Screen Editor, a full screen editor to supplement regular EDIT commands. Works on the CoCo 1&2 and with the CoCo 3, WIDTH 32, 40 and 80 is supported! Complete screen cursor control plus features to make EDITing Basic programs a snap! BSE, a must have utility. Our low price was the only corner that was cut on this quality program. 64k Disk

CHECK-09MV: $25.95
Version 2.1 NOW supports full EDITing command! Check-09MV interacts with MultiVue for FAST & EASY checkbook balancing. No more waiting for your bank statement for an ending balance. Check-09MV will produce a check-by-check running total of your account in an easy to use format that eliminates those monthly surprizes! 512k Disk

VIP LIBRARY: $149.95
This popular 'intergraded' package includes VIP Writer, Terminal, DataBase, Calc, and Disk Zap which can fix a disk with I/O errors. 64k Disk

VIP Writer III w/Dictionary	**$79.95**
VIP DataBase III	**$69.95**
VIP Calc III	**$69.95**

SPECIAL: Order any VIP program from SCS and receive an additional program at NO EXTRA CHARGE! Call or write for details.

SOFTWARE BY ColorVenture

Ram Disk Lighting-512k	$16.95
Printer Lighting-128k	$16.95
BackUp Lighting-512k	$16.95
All 3 for only	$42.95
Hi-Res Joystick Driver	$19.95
Max Patch	$19.95
Both for only	$34.94
MAX-10	**$78.45**
CoCoMax III	**$78.45**

NEW PRODUCTS FROM SCS

WORD SEARCH: $22.95
Word Search Generator Utility will create simple to complex Word Search puzzles. The whole family will enjoy generating their own puzzle. Word Search Generator Utility is ideal for newsletters or monthly flyers. Full printer and disk supported. 64k Disk

SPACE RAIDERS: $16.95
Fast action arcade game that will test your skill and reflexes! Program allows you to save or load in your high scores and is CoCo 1, 2 & 3 Compatible. 32k Disk

STARPIC UTILITY: $19.95
STARPIC PICTURE UTILITY will print PMODE pictures on your Star NX-1000 printer. STARPIC works within a Point 'N Click pull down menu environment. Loads in ANY /MAX extension picture file. Select different PMODE screens and even 'INVERT' your picture! This is a full featured, easy to use graphics picture printer utility. 64k Disk

DMP-PIC UTILITY: $19.95
Same full features as STARPIC, but supports the Tandy DMP printers. 64k DISK

STAR*MAX: $24.95
Finally, an easy to use, full featured Color Print Utility for the Star NX-1000 Rainbow Printer. Print CoCoMax 3 or ColorMax pictures in living color and bring your CoCo 3 screen to the printed page. 128k Disk

CGP*MAX: $19.95
Same basic program as StarMax, but, CGP-MAX is for your Tandy CGP-220 color printer. 128k Disk

UltiMusE III $54.95
The Utlimate Music Editor that has the others saying 'What If...'? Experience the difference! Requires, OS-9 Level 2, & MIDI Keyboard. 512k Disk

A-DOS 3: $34.95
The popular Disk Operating System from SpectroSystem for the CoCo 3. 128k Disk

MY DOS: $14.95
Access Double Sided Drives, use the J&M Controller with the CoCo 3, DIR commands simplified & a host of other special features. 64k

SCS can custom 'burn' your purchased DOS for only **$15**! This includes the price of the EPROM chip and the BURN charge. Call or write for details.

OS-9 SOLUTION: $24.95
Tame the hostile environment of OS-9 SOLUTION! Replaces 20 of the command calls with single keystroke, menu driven commands. No more long and complex pathnames or syntaxes to remember! Works with either OS-9 Level One or Two.

SDP: $22.95
Schematic Drafting Processor, a FAST & EASY to use Electronic Drafting Processor. Create designs using a 480x540 screen with 6 viewing windows. Over 30 electronic symbols & 10 definable symbols. Even supports Logic gates & Multipin chips! Print a hard copy or save to disk for later editing. **NOW** CoCo 3 Compatible. 64k Disk

MULTI-PAK CRACK: $24.95
Allows you to save your ROM-PAK programs over to disk...WHERE THEY BELONG! Includes POKES for problem PAKs and the new 16k PAKs. 64k Disk.

CoCo Calender Deluxe	$19.95
BlackJack Royale	$16.95
Tape/Disk Utility	$19.95
CoCo Keyboard	$6.95
TelePatch	$24.95
Pyramix (CoCo 3)	$19.95
Start OS-9 (Book & Disk)	$34.95

SECOND CITY SOFTWARE

THE NEWSPAPER PLUS $48.95
DeskTop Publishing for the CoCo 3? With the **ALL NEW** NEWSPAPER PLUS, you can create complete and sophisticated Banners, Headlines along with Text Columns and Graphics. NEWSPAPER PLUS allows for importing different pictures, fonts and fill patterns from disk for that pro-look. Comes complete with 22 fonts, 50 NewsArt pictures and fill patterns. 128k Disk

THE NEWSPAPER GRAPHICS DISK I	**$19.95**
NewsArt A thru Z: 26 disks of Clip Art for NEWSPAPER PLUS	**$9.95** ea.

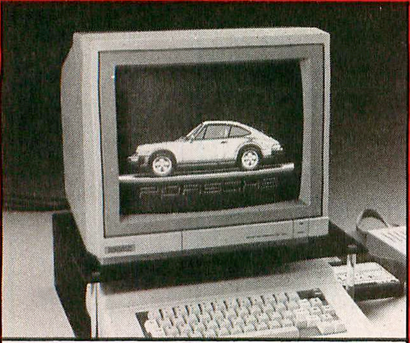
MASTER CARD - VISA
C.O.D. - MONEY ORDERS

ADD $2.50 SHIPPING
($4.50 FOREIGN) AND
AN ADDITIONAL $2.50
FOR C.O.D. ORDERS

Allow 1 to 3 weeks delivery

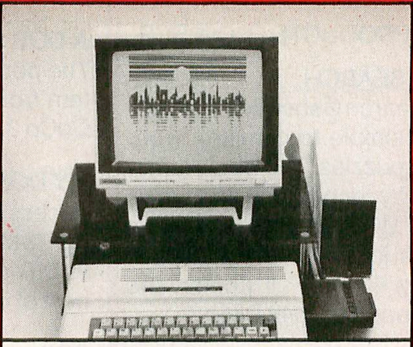
P.O. BOX 72956
ROSELLE, IL
60172

ORDER
312-653-5610
BBS
312-307-1519



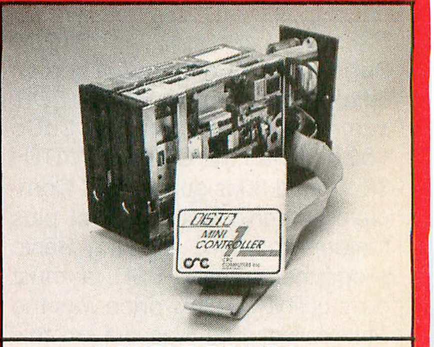
MAGNAVOX 8CM515 COLOR
- 80 Column
- Use with Coco, Tandy 1000's, IBM PC

CC-3 RGB cable 19.95 $279 (14 ship)



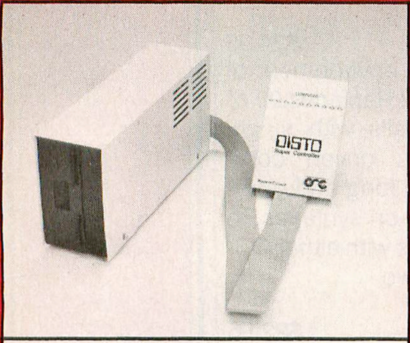
MAGNAVOX 7622 AMBER
- 80 Column
- Built in Speaker

$98 (7 ship)



DOUBLE DRIVE 0 +
- Two double side 360K Teac 55B
- Disto controller & cable

$310 (8 ship)

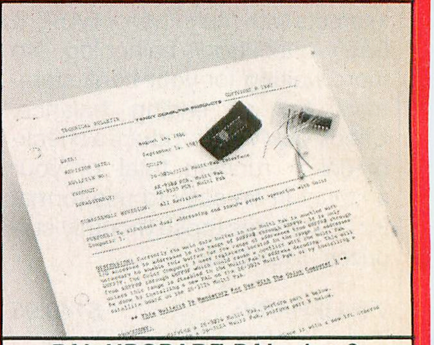


DRIVE 0 PLUS
- Double sided 360K MPI 52
- Disto Controller and cable

$178.45 (5 ship)

STAR NX-1000R COLOR
- Built in back tractor paper feed
- Joe Walker Star Max Color printer driver and SP-C converter add $40

$249 (5 ship)



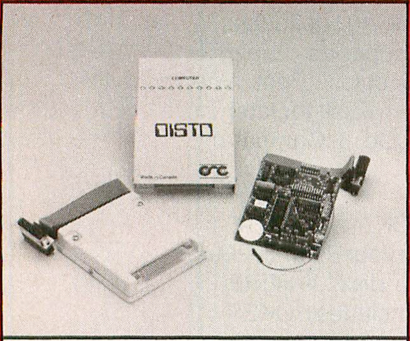
PAL UPGRADE PAL - 1 or 2

Makes multi-pack interface work with Coco 3. Specify 26-3024 or 26-312W

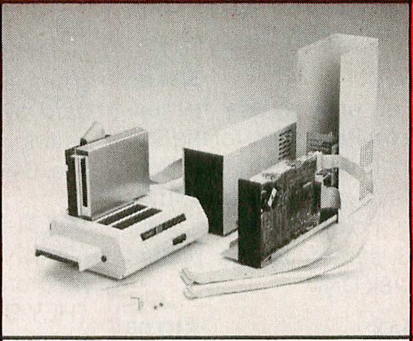
$14.95 (2 ship)

30 Day Money Back Guarantee

Howard Medical's 30-day guarantee is meant to eliminate the uncertainty of dealing with a company through the mail. Once you receive our hardware, try it out; test it for compatability. If you're not happy with it for any reason, return it in 30 days and we'll give your your money back (less shipping.) Shipping charges are for 48 states. APO, Canada and Puerto Rico orders are higher.



A. DISTO 3 in 1 Board	$59.45
B. DISTO MEB	$30.00
C. DISTO RS-232	$49.95

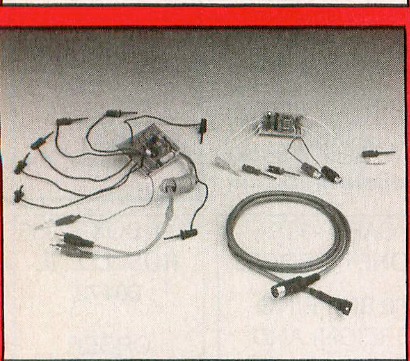


Hard Drive — Complete!

20,000,000 Bytes or the equivalent to 125 R.S. 501's on line are packed into this hard drive, pre installed and ready to run. This complete, easy to use package includes a Seagate 20 Meg Hard Drive, a DTC 5150 Controller and interface*, heavy duty case & power supply, and a 1 year warranty. This 20 meg Hard Drive will also work with Tandy and IBM clones. Basic driver, $29.95, lets you access this hard drive without need for OS-9.
(9 ship)

HD-1	20 Meg	$499
HD-2	30 Meg	$549
HD-3	40 Meg	$598

*Burke & Burke



VIDEO AMPLIFIER VA-1

required in CoCo 1 or 2 to drive monitor $29.45 (2 ship)

Howard Medical Computers
1690 N. Elston
Chicago, Illinois 60622

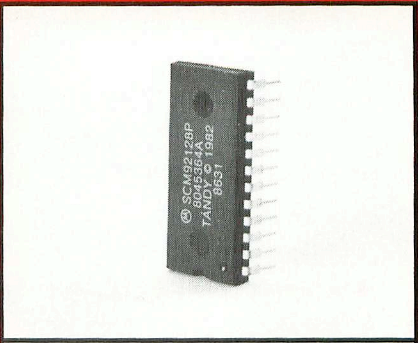
Order Status and Inquiries
312-278-1440

Show Room Hours
8:00 - 5:00 M-F
10:00 - 3:00 Sat.

24 Hour Order Line
800-443-1444

STAR NX 1000

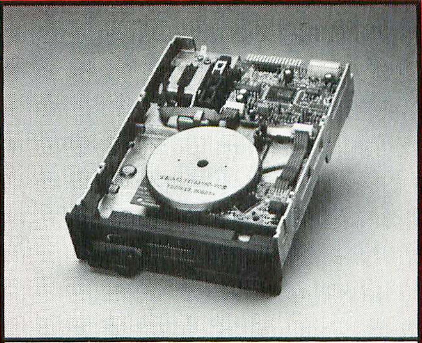
- Dot Matrix; 144 CPS
- Back Tractor & Friction Feed
Needs SP-C **$189** (5 ship)



RS 1.1 DOS

- ROM Chip for Disk Controller
- Works for CoCo 2 or 3

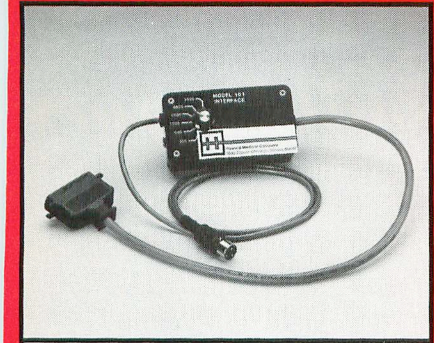
$25 (2 ship)



TEAC 55B

- 360K Double Sided Half Ht. Floppy
- Fits R.S. 501 & 502

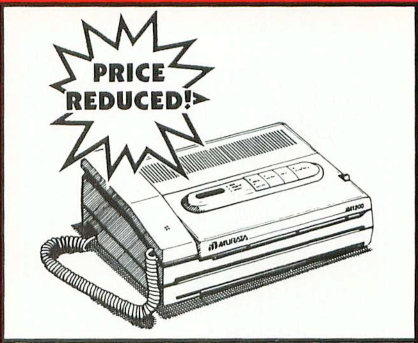
$98 (2 ship)



HOWARD SP-C

- Serial to Parallel Converter
- Connect CoCo to Parallel Printer

$68.45 (2 ship)


PRICE REDUCED!

RICOH RF800

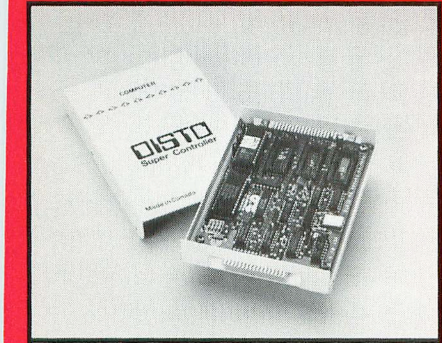
- Group 3 & 2 Compatible
- 200 by 200 Resolution

$695 (7 ship)

RICOH RIPRO JR. COPIER

- 15 second warm up
- User replacable master unit

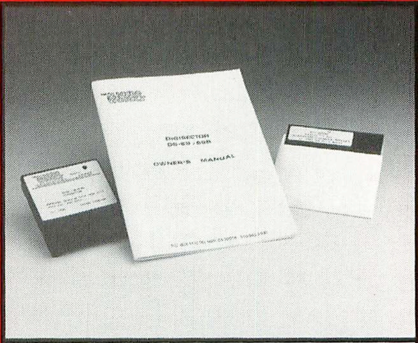
$595 (7 ship)



DISTO DC-3

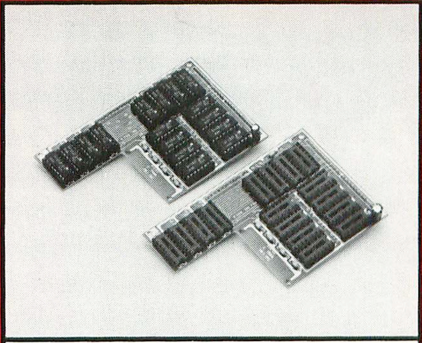
- Original Disto Controller
- 2 ROM Slots; Gold Platted Contacts

$98 (2 ship)



MICRO WORKS DIGITIZER

• DS-69B Color 1.5 Second/Picture	**$150**
• DS-69 B&W 2 Second/Picture	**$100**

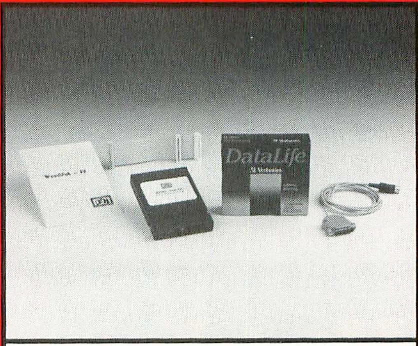


MEMORY

• 512K Bare Board	$40
• Populated 512K & Software	$119
• 64K 8 Chip for CoCo 2	$30

DISTO DC-7

- Mini Disk Controller for CoCo 1, 2, 3
- Includes RS 1.1. Modifyed to access DS Drives **$75** (2 ship)



Y CABLE	$28
WORD PAK - RS	$49

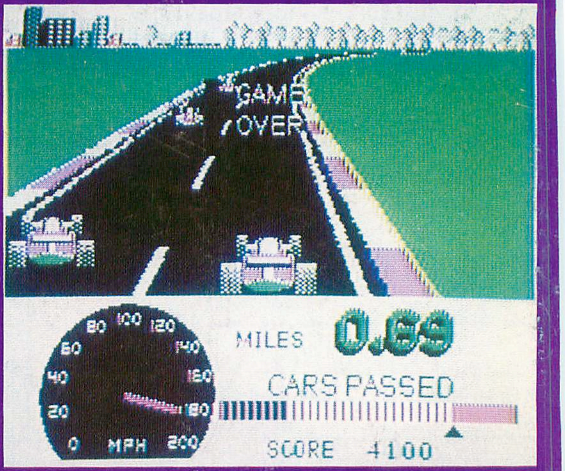
Howard Medical Computers
1690 N. Elston
Chicago, Illinois 60622

Order Status and Inquiries
312-278-1440

Master Card • Visa • Discover
American Express
C.O.D. • School P.O.'s

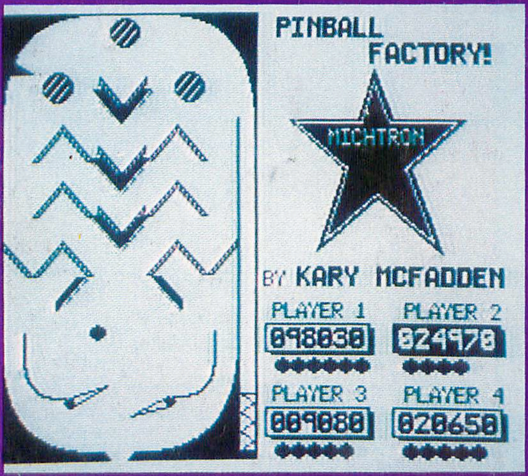
24 Hour Order Line
800-443-1444

Speed Racer



As the checkered flag drops your pulse rises in this lively arcade game. The road twists to the horizon on the 3-D panorama that sets the stage for exciting racing. Vie for time as you glide through the curves at incredible speeds. Step through the gears to stay ahead of the pack, but be quick! Some will stop at nothing to see the end of the race, or the end of you! Four challenging raceways, complete with obstacles and colorful 3-D scenery test your skills in this Pole Position™ type game.

32K Color Computer required...$34.95

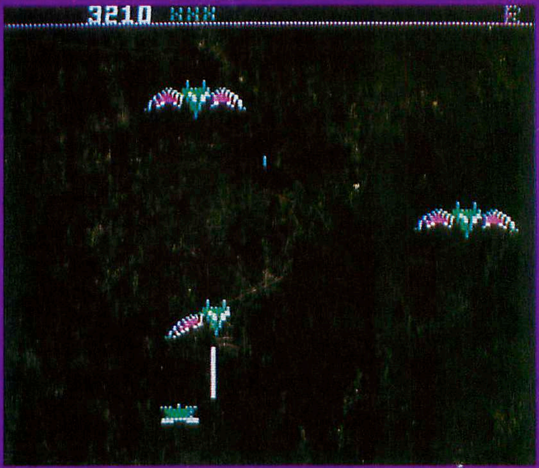


Pinball Factory

Video games come full circle in this tribute to the original arcade game, *Pinball*. Classic pinball springs to life as never before, with fresh new angles that only a computer can offer. Crisp graphics, sound, and fast smooth action give this machine-language arcade game a realistic, responsive feel you'll hardly believe. There are even "tilt" buttons that let you "bump" the machine. In addition to playing a great game of pinball, you can enjoy hours of creative pleasure as you design, build, edit, and play your own screens.

64K Color Computer required...$34.95

Demon Seed



The first waves of flying, diving, bloodthirsty bats are arriving. Move, fire, and move again. It's a never ending battle. If you are lucky enough to defeat the bats, be ready for a much greater challenge, The *Evil Demons* themselves. Destroy a wing and another takes its place. Only a direct hit can save you now. It will take great skill to triumph. If you do, then you better be ready for the *End*. The Demon Flag Ship descends to destroy your remaining ships. Your only hope is to penetrate the hull, break through the shield, and destroy the dreaded Gargoyle.

32K Color Computer required...$19.95

MichTron is always looking for programmers and programs. If you are interested in working with one of the most respected company's in the computer software field please give us a call.

MichTron®

For more information
on these or other fine products
call our knowledgeable staff!

576 S. Telegraph
Pontiac, MI 48053
(313) 334-5700

Dealer inquiries welcome.
Visa and Mastercard accepted.